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Instructional Designers' Insights Regarding Factors that are

Important Yet Lacking in Subject Matter Experts

by

Susan Palmer

A dissertation

submitted in partial fulfillment

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List of Abbreviations

AECT   Association for Educational Communications and Technology

ATD   Association of Talent Development

ID   Instructional Designer

SET   Social Exchange Theory

SME   Subject Matter Expert

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Instructional Designers' Insights Regarding Factors that are Important Yet Lacking in Subject
Matter Experts

Dissertation Abstract -- Idaho State University (2023)

This study builds upon previous research by Mattoon (2005), who identified six key subject

matter experts (SMEs) factors: breadth of knowledge, depth of knowledge, articulation skills,

availability, interpersonal skills, and attitude. This research aims to explore the frequency and

importance of these factors, as perceived by instructional designers (IDs), and identify any areas

where SMEs are lacking. The study collected data through an online survey distributed in

relevant Facebook and LinkedIn groups. A total of 126 completed responses were obtained and

analyzed using statistical methods such as the Kruskal-Wallis H and Mann-Whitney U tests. The

findings revealed that all capability and suitability factors were encountered by IDs in previous

knowledge extraction, with Depth of Knowledge being the most frequently observed factor, and

Articulation Skills were identified as an area where SMEs struggle to effectively communicate

information. IDs considered all the capability and suitability factors to be important for effective

knowledge extraction, with Depth of Knowledge receiving the highest importance rating.

Interpersonal Skills were perceived as relatively less important, suggesting room for

improvement in SMEs' ability to build effective relationships and collaborate. Regarding areas of

lacking, SMEs indicated a need for improvement in Depth of Knowledge, highlighting a desire

for more experience and expertise in their respective fields. Articulation Skills were identified as

a significant gap, indicating a need for SMEs to enhance their communication and presentation

abilities.

Key Words: SME factors, design team collaboration, knowledge extraction

CHAPTER I: INTRODUCTION

Valerio (2021) emphasized that obtaining knowledge is the most important objective when designing a class or training. This involves collaboration between the instructional designer (ID) and subject matter expert (SME) to bridge the communication gap between the student and SME, thereby enabling effective learning. Therefore, SMEs must possess topic knowledge and the willingness and skills to collaborate effectively (Valerio, 2021). Furthermore, teamwork is essential to consider for promoting shared objectives, fostering active leadership, and encouraging interaction (Hart, 2018). However, it is important to recognize and navigate potential challenges that may impede progress toward this goal.

Descriptions and Purpose

Successful knowledge extraction, the process of gleaning information from SMEs, and course design require both the ID and SME to bring their unique skills to the table (Lavin et al., 2007). According to Richardson et al. (2019), this type of collaboration is a partnership where collaborators can leverage each other's talents to achieve what they could not have accomplished alone or as effectively. SMEs contribute subject knowledge, experience, and skills throughout the design and development process (Lavin et al., 2007). Nevertheless, the responsibility for effective collaboration and project management ultimately falls on the ID (Hart, 2018; Heggart & Dickson-Deane, 2022; Khalil & Elkhider, 2016).

Instructional Designer

An instructional designer enhances learning by applying instructional design principles, models, and theories to achieve effective learning as shown through evaluation methods (Heggart & Dickson-Deane, 2022). Richardson et al. (2019) describe instructional designers as

the "glue that holds everything together" (p. 857). To accomplish this, the ID must have unique skills used in consultation, project management, and effective communication (Kumar, 2017).

Subject Matter Expert

Hopkins and Unger (2017) describe a subject matter expert as a person who has experience, knowledge, and skills in a particular field and continues to learn; however, the designation of a subject matter expert can be ambiguous. Yarovoy et al. (2020) investigated the potential SME credentials of those who edited Wikipedia pages. These researchers found that only 10%-30% of Wikipedia page editors met the criteria for being a SME on the topics they edited (Yarovoy et al., 2020). This is "concerning" (p. 21:5) and highlights that 70%-90% of Wikipedia page contributors assume they are SMEs when their credentials do not show them deserving of the SME title (Yarovoy et al., 2020). Lavin et al. (2007) went as far as to say that "just about anyone can hang out their shingle and declare themselves an expert" (p. 190) which emphasizes the importance of having standard requirements attached to the SME label.

SMEs can be valuable resources by providing knowledge and expertise throughout the creation of instructional and evaluation material (Lavin et al., 2007). Goldstein et al. (2018) studied the practice of computer deep learning methods in place of subject matter expertise in ten research studies in the medical field that analyzed clinical notes, assessed radiological images, and predicted clinical outcomes. The authors found that as computers became more powerful, and used to find, collect, and collate data, the necessity for SMEs to interpret results increased as a naïve data analysis led to unsupported and mistaken conclusions. However, as big data and machine learning have become essential to the hypothesis generation and discovery process, well-curated data sets and well-designed studies are needed to confirm those assumptions (Goldstein et al., 2018).

Castleberry, et al. (2016) also found that SME input helps students earn passing grades as they used summative assessment to study professional pharmacy programs. The authors studied 37 faculty members' writings on almost 700 submitted documents using content validity determinations concerning student and curricular outcomes. They found that passing standards increased annually (45% in 2009 to 67% in 2014) as SMEs' writings targeted necessity scores and item difficulty.

Subject Matter Experts Factors

It is essential to understand what important factors SMEs need to possess. Mattoon (2005) conducted an online survey of instructional designers who had experience working with SMEs. The study revealed six important SME factors that IDs consider important to the process of knowledge extraction. These six factors comprised three capability factors (breadth of knowledge, depth of knowledge, and articulation) and three suitability factors (availability, interpersonal skills, and attitude). Given the significance of each of these factors in the knowledge extraction process, they are explained below.

Capability Factors

Mattoon (2005) describes capability factors as the breadth of knowledge, depth of knowledge, and articulation skills. All three areas were found to be essential to effective knowledge extraction (Mattoon., 2005). Lavin, et al. (2007) clarified that knowledge, practice, and application of the SMEs' topic area of expertise are very important; however, they are considered wasted if SMEs do not possess the ability to communicate that knowledge.

Breadth of Knowledge

The breadth of knowledge refers to the amount of formal education a SME has acquired (Mattoon, 2005). This factor is typically what people consider when looking for a SME and can be found by checking the candidate's curriculum vitae, publications, and presentations (Lavin et al., 2007). Formal education does have advantages as a SME possesses a basic understanding of how classes are organized and what/how the material has been taught (Lavin et al., 2007). However, this knowledge alone risks a "silo" effect where SMEs tend toward specialization and learning of ideal conditions rather than what may be considered normal working conditions for those in the field (Lavin et al., 2007).

Depth of Knowledge

Depth of knowledge refers to a SME's experience and application of knowledge acquired from working in the associated career field (Mattoon, 2005). This form of education can be essential as Hastie and Vlaisavljevic (n.d.) found that educators with higher work experience provide more productive learning by assigning more tasks that focus on the quality of performance rather than participation or effort.

Articulation Skills

Breadth and depth of knowledge are important to a point, but only if coupled with the ability to explain the material (Lavin et al., 2007). Often those with high knowledge have difficulty explaining and articulating technical knowledge to those who lack a technical background (Mattoon, 2005). Rouse et al. (2017) state that an individual who lacks impact is either "someone who is highly proficient, with extensive and deep knowledge, but is unable to convey it to others; or someone with the ability to influence and communicate but lacks

substance. Experts have both deep knowledge and the ability to influence and communicate it"
(p. 769).

Suitability Factors

While knowledge is often regarded as the most important factor of a SME, other factors
are also needed (Lavin et al., 2007). Suitability factors of availability, interpersonal ability, and
attitude can be highly valuable in working with the SME to produce content (Lavin et al., 2007).

Availability

According to Lavin et al. (2007), availability consists of two elements: time and freedom.
The SME should have ample time to fulfill their obligations and attend meetings as agreed upon.
This is especially important during the initial stage when the SME's technical knowledge is vital
in developing learning materials and establishing learning objectives (Lavin et al., 2007). In
addition, independence is critical, as a lack of it can impede success (Lavin et al., 2007). The
authors explain that the SME must have the freedom to provide honest recommendations based
on their expert judgment, without their employers' approval or interference.

Interpersonal Skills

Interpersonal skills can be described as professional courtesy, level of comfort, sense of
humor, mannerisms, and communication style (Mattoon, 2005). The author suggests that these
skills be closely observed as the SME is introduced to the project team members. Interpersonal
relationships are vital to team members feeling they belong and are involved in a successful
venture (Shockley-Zalabak, 2009).

Attitude

According to Mattoon (2005), the attitude of a SME can significantly impact performance. "Since most attitudes are based on deep-rooted beliefs that develop over a lifetime of experience and are not easily changed, expecting a negative attitude to change during the curriculum development process is not realistic" (Mattoon, 2005, p. 66). However, a positive attitude results in a sense of pride and elevated personal interest in the final product which denotes meticulous attention to organization and accuracy (Mattoon, 2005). A design team expends more effort to develop a quality product if there was a high value placed on the project (Richardson et al., 2019).

Purpose of Study

Effective knowledge extraction requires a SME to possess sufficient capability and suitability factors (Valerio, 2021). These factors can help avoid potential issues, resulting in efficient and high-quality projects (Lavin et al., 2007; Richardson et al., 2019). Mattoon (2005) identifies these SME factors as three capability factors (breadth of knowledge, depth of knowledge, and articulation), and three suitability factors (availability, interpersonal skills, and attitude). This study seeks to identify which SME factors are considered important but lacking by instructional designers for effective knowledge extraction. The findings of this research may help improve SME/ID teamwork and enhance knowledge extraction.

Research Questions

This study shed light on the capability and suitability factors that are presently lacking in facilitating effective knowledge extraction. To address this gap, this dissertation project answered the following research questions:

RQ1: How frequently have instructional designers encountered the capability and suitability factors in previous knowledge extraction?

RQ2: What capability and suitability factors do instructional designers consider important for effective knowledge extraction?

RQ3: Which capability and suitability factors do instructional designers consider to be lacking for effective knowledge extraction to occur?

Limitations

During the planning phase of a project, it is important to recognize and address the challenges and limitations of quantitative research as failure to do so can compromise the integrity of the results. In quantitative research, reliability is crucial for ensuring consistent outcomes. This means that the instrument used to measure the construct should produce consistent measurements under the same conditions if repeated (Oliver-Hoyo & Allen, 2006).

This study's participants will consist of instructional designers. The sample was gleaned from volunteer participants from professional organizations, LinkedIn groups, and Facebook groups associated with IDs.

The study's limitations include:

- Only IDs associated with the above-listed groups were invited to participate in the study leaving the possibility that different results may be produced by differing groups and organizations.
- It is likely that only those with strong positive and/or negative opinions will respond causing non-response bias.

- The participant's mood, satisfaction levels, life circumstances, or current national/local news stories may cause variance in responses.

- The interpretation of data and instruments was based on the researcher's analysis.

Several of these challenges pertain to the research design and implementation, including the use of unbiased wording and question order, sample selection, observer bias, and reflexivity. Other challenges relate to the perceived credibility of the research method by readers (Creswell, 2009). To minimize speculation and doubt regarding the findings, research must be conducted in a rigorous and transparent manner (Jones, 2013). This study has been designed with these considerations in mind and is outlined in greater detail in Chapter Three of this dissertation.

Definitions

Instructional Designer enhances learning by applying instructional design principles, models, and theories to achieve effective learning as shown through evaluation methods (Heggart & Dickson-Deane, 2022).

Subject Matter Expert is a person who has the experience, knowledge, and skills in a particular field and continues to keep updated on new information in their field of expertise (Hopkins and Unger, 2017).

Knowledge is "information combined with experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decisions and actions" (Davenport, De Long, & Beers, 1998, p.43).

Groups are characterized by varied skills, individual accountability, and sharing of information. Groups are used for unstructured projects (Andrade, et al., 2021).

Teams emphasize complementary skills, mutual accountability, common purpose/approach, and collective performance. Teams must be actively structured, managed, and involve coaching and leadership skill development (Andrade, et al., 2021).

Significance of the Study

This study provided a more detailed look into the relationship between an ID and SME, specifically focusing on the SME factors needed but lacking to improve the knowledge extraction process. Mattoon (2005) described these SME factors as three capability factors (breadth of knowledge, depth of knowledge, and articulation), and three suitability factors (availability, interpersonal skills, and attitude). The results of this study could lead to improvements in the understanding of factors that can improve the quality and efficiency of educational projects.

CHAPTER II: LITERATURE REVIEW

Since the 1990s, online learning has played a growing role in education for reasons including lowering institutional costs, recruiting additional students, increasing revenue, addressing on-campus overcrowding, and offering learning flexibility (Chen & Carliner, 2021). However, making knowledge attainable can be problematic as answers to questions and body language are not always accessible in an online environment (Valerio, 2021). According to Rodriguez et al. (1991), both the ID and SME play unique roles in the course development process by designing classes that lower this hurdle. The ID typically takes responsibility for management activities, development, and design, while the SME disseminates special expertise and knowledge regarding the instructional topic or audience (Rodriguez et al., 1991). This literature review aims to explore their relationship and responsibilities in hopes of providing insights on how to improve the knowledge exchange process and enable IDs and SMEs to work together more effectively.

Types of Subject Matter Experts

Several factors require consideration when determining a SME, the first being their origin. SMEs sourced from within the organization may have the advantage of an existing relationship and a shared understanding of goals and needs. However, bringing in an external full-time SME may provide more specialized expertise in their assigned responsibilities. Compensation is also a crucial factor to consider. Unpaid SMEs may have competing priorities which could make commitment challenging. On the other hand, professional SMEs require compensation for their time making it easier to ensure commitment; however, this necessitates an evaluation of costs versus benefits. The last consideration is the type of SME: Technical, Functional, and Sentinel which are explained below.

Technical

Technical SMEs play a vital role in providing subject knowledge and ensuring accuracy in every aspect of content created by the ID. These experts primarily work during the design phase of a project. This is the type of SME that this research is focused on.

Functional

Functional SMEs offer knowledge of the audience and implementation related to modality and design. They may have minimal knowledge of the content but can provide useful information about the content creation process. These types of SMEs can be team leaders/managers, those who have previously delivered content to this audience, or advocates within the audience who can assist in ensuring that the material is produced and deployed in a way that provides the greatest possibility of success. These SMEs provide materials for development, technical support, and logistical support.

Sentinel

Sentinel SMEs are usually senior stakeholders and board members who have minimal technical or implementation knowledge. They are involved as a project sponsor. These SMEs offer political support and assist in gaining buy-in among senior leaders. Sentinel SMEs act as guardians of a course design project and provide organizational overview and support.

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Working Relationship Classifications

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To a certain extent, work relationships are transactional (Materne, et al., 2012). These relationships often involve working with people with whom one would not have a relationship outside the workplace (Cao, et al., 2012). As such, ID relationships can take several forms

including mentorship, customer service, collaboration, administration, and change agent which are discussed below.

Mentorship Relationship

IDs mentor SMEs in several areas including considering different teaching strategies, preparing learning objectives, and exploring various assessment strategies (Chen & Carliner, 2021). To achieve this, IDs challenge SMEs to think critically about teaching material based on learners' needs, technology considerations, and material accessibility (Ritzhaupt & Kumar, 2015). IDs' technology and emerging pedagogy training promote the creative and innovative thinking needed for these relationships to happen (Stevens, 2013).

Customer-service Relationship

Ritzhaupt and Kumar (n.d.) discovered that instructional designers are frequently viewed as technical experts; however, their practical and theoretical knowledge often extends beyond their technical proficiency. As a result, SMEs often request that IDs provide various services needed by the SMEs, who, in those instances can be regarded as a customer they are striving to satisfy (Bawa & Watson, 2017). When acting in this capacity, diplomacy is critical (Ritzhaupt & Kumar, n.d.).

Collaboration Relationship

According to Chen and Carliner (2021), IDs should invite SMEs to collaborate and integrate their unique skills into the project where both individuals utilize effective communication strategies and exert the necessary effort. Bawa and Wilson (2017) add that communication is vital for building a strong relationship, which starts with understanding the

other person's objectives and values. Collaborating, as noted by Richardson et al. (2019), Bates (2014), Hart (2018), and Minbaeva (2021), fosters the creation of successful learning methods.

Administrative Relationship

Several authors suggest that IDs take on an administrative role as part of their duties. For instance, Carré (2015) suggested that IDs assist in determining projects and classes to undertake. Keppell (2004) and Dick and Ives (2008) suggest that IDs join institutional committees to provide input on strategic plans involving course design and development. Additionally, Heggart and Dickson-Deane (2022) note that project management and other administrative responsibilities belong to the ID.

Change-agent Relationship

During World War II, instructional designers revolutionized training methods to train soldiers effectively and efficiently (Reiser, 2001). Since then, instructional designers have continued to act as change agents, impacting not only individual projects but also transforming how learners, institutions, and society interact with technology (Campbell et al., 2009; Chen & Carliner, 2021). Anderson (2010) emphasized the importance of being mindful of the impact of change on others. Daft (2008) suggested open and honest communication as the most effective way to overcome resistance to change thus reducing uncertainty, providing a sense of control, clarifying benefits, and building trust.

<center>**Working Relationship Factors**</center>

Successful teams are built as leaders take specific actions to bring team members together (Daft, 2008). By providing a nonjudgmental attitude through observation and listening, team members feel valued and provide more productive behavior as they feel heard and appreciated

(Shockley-Zalabak, 2009). The previous dependence on personal knowledge and hard skills is now being replaced by leaders who succeed in soft skills (Hopen, 2010). Some of these soft skills are described below.

Communication

Strong communication is necessary for IDs and SMEs to understand each other's goals, exchange ideas, and build strong relationships (Chen & Carliner, 2021). According to Rodriguez et al. (1991), "a strong relationship with the SME- marked by open, honest communication-greatly assists the ID in development efforts" (p. 27). This also includes a common vocabulary, which can be challenging as IDs and SMEs often come from differing educational backgrounds (Xu & Morris, 2007). Finding common vocabulary often takes effort; however, this helps the ID better understand the SME's intentions and minimizes tensions (Pan & Thomas, 2009). By being coy or mincing words, the intended message is unclear and diluted, thus preventing an honest conversation from occurring (Block, 2010).

Attitude

Outlaw and Rice (2015) explained that attitude encompasses open-mindedness, patience in dealing with challenges, and mutual respect. Various authors have proposed effective ways of achieving this goal. For instance, Bawa and Watson (2017) stated that open-mindedness enables the ID to support the SME better while meeting project objectives. Open-mindedness also strengthens team relationships by fostering an understanding of the other's perspective and empathizing with their beliefs about course design (Bawa & Watson, 2017). In addition, patience and interactive conversations are essential for understanding the other's thoughts and intentions (Major et al., 2014) and for dealing with the challenges that may arise during the design process (Pan et al., 2003). Positive interactions between the leader and team members, as discovered by

Tsai (2011), can enhance team collaboration/communication, and improve goal attainment while maintaining high job satisfaction. Outlaw and Rice (2015), Pan and Thompson (2009), and Stevens (2013) summed it up by saying that the ID and SME must show mutual respect for each other's feelings, perspectives, and expertise.

Trust

According to Daft (2009), trust is a critical element for successful communication that can prevent hidden agendas and ineffective listening. Richardson et al. (2018) attribute the responsibility of establishing effective collaboration and a relationship based on reciprocity, openness, and trust to the ID. As Kinicki and Kreitner (2008) suggest, trust must be earned and cannot be demanded. Building rapport is an essential aspect of developing trust, which is crucial for fostering a successful working relationship, generating buy-in, and reaching agreements on the most suitable strategies and learning materials for the project (Ziegenfuss & Lawler, 2008).

Commitment

According to Curtis et al. (2017), each team member must be committed and accountable for their assigned roles and adhere to the timeline for course development. To achieve this, team members must first have a comprehensive understanding of their responsibilities and deliverables (Knowles & Kalata, 2008). Next, members should internalize the project goals and values, which can be facilitated by observing the leader's commitment (Daft, 2008). Although each member has specific assignments during the development process, all team members bear responsibility for the course's quality (Shaver, 2017; Stevens, 2013).

Flexibility

Flexibility entails being willing to compromise and manage time effectively (Dicks & Ives, 2009). This can be challenging for IDs who typically have multiple project deadlines and SMEs who may require time for other assignments and research (Chao et al., 2010). Without flexibility, there could be a temptation to lower goals and compromise the final product's quality, as suggested by Kang (2001). However, Jones and Gareth (2005) found that difficult goals generate higher motivation than easy or moderate goals, which can then foster enthusiasm among team members to achieve them.

Empowerment

According to Chen and Carliner (2021), empowerment is linked to the team members' perceived level of control over the project and their degree of autonomy in the process. The authors note that the ID should be clear and reach an agreement on the leadership and ownership early in the process. However, McCurry and Mullinix (2017) acknowledge it can be challenging if the SME owns the course and has decision-making rights related to the project. In this case, the ID can have an impact on the decisions, but cannot make the final decision for the SME (Chen & Carliner, 2021).

Workplace Culture

According to Anderson (2010), high-performing team culture is established when members operate collaboratively and authentically. The author further emphasizes that key organizational traits that foster this healthy environment include well-aligned values and effective communication. Shockley-Zalabak (2009) supports this idea and highlights the importance of interpersonal relationships and communication to team members' sense of belonging. When team members have a clear sense of their identity and feel their needs are met,

the group culture thrives, and each member develops strong individualism while actively contributing to the team's success through collaborative efforts (Anderson, 2010).

Building Effective Relationships

According to Bell (2010), Hopen (2010), and Sessa et al. (2007), a cohesive team is essential to ensure that members work towards the same objectives and vision. To achieve this, leaders must have a clear understanding of their team and themselves and then actively seek out and apply leadership techniques that enhance team unity and morale (Bell, 2010). Emotional intelligence, relationship building, and diplomacy are the primary factors identified by Ritzhaupt and Kumar (2015) as necessary for this to occur. Below are further details about these elements and techniques.

Effective Management

To achieve effective management, Chen and Carliner (2021) recommend that IDs be attentive and responsive to SMEs' needs. As each step in the development process builds upon the previous one, reflecting on the technological and pedagogical support required by SMEs can enhance future actions and contribute to the success of the final product (Chen & Carliner, 2021). McCurry and Mullinix (2017) refer to this as the ID acting as a concierge by providing personalized and timely support to SMEs. On the other hand, Hixon (2008) emphasizes that IDs possess decision-making authority and employ various management tools to facilitate an efficient and seamless process. Since both roles are necessary during the development process, three essential management tools are discussed further.

Emotional Intelligence

Daft (2008) notes that the most effective method for developing emotional intelligence is understanding the wide range of emotions and how they present themselves in oneself and others. Shockley-Zalabak (2009) suggests that IDs can achieve this by tracking their emotional responses and assessing their relevance in various situations. By practicing non-judgmental observation and active listening, IDs can assist team members in understanding others' emotions, perspectives, and project value leading to more productive behavior (Shockley-Zalabak, 2009).

Social Exchange Theory

Materne et al. (2012) theorize that collaborative work relationships rely on social capital, which is essentially a transactional exchange. Social exchange theory (SET) holds that interpersonal relationships create value by providing resources that enable individuals to achieve desired outcomes (Bizzi, 2015). Simply put, SET is an economic analysis of a social setting in which people aim to maximize benefits while minimizing costs (Cook et al., 2013). Benefits refer to desirable items or emotions like fun, friendship, companionship, collaboration, and other things deemed valuable, while costs are the negatives one must expend in the relationship, such as money, time, and energy (Cook et al., 2013). According to SET, individuals weigh the personal appeal of benefits against the perceived costs. If the costs exceed the rewards, individuals will terminate or abandon the relationship (Emerson, 1976). A core principle of SET is that relationships develop over time into mutual, loyal, and trusting connections (Cropanzano & Mitchell, 2005). To foster social capital with colleagues, IDs must engage in conversations, involve others in decision-making, and show care and support for others (Materne et al., 2012). This way, when assistance is needed, these colleagues are more likely to offer valuable support instead of just meeting the minimum requirements (Bizzi, 2015).

Motivation and Nonmonetary Rewards

Individuals interpret and evaluate information based on their perspective, mental models, culture, education, and empathy (Deutsch et al., 2006). Therefore, equal rewards may not always be perceived as fair when two different perspectives are involved in assessing their value (Spreckelmeyer et al., 2009). Such differences in reward valuation can impact the level and effectiveness of reward-based satisfaction (Spreckelmeyer et al., 2009). Vroom proposed that individuals are motivated when they desire certain outcomes, believe that specific behaviors will lead to achieving these outcomes, and are convinced that their efforts will result in high performance (George & Jones, 2007).

Although many institutional leaders believe that money is the primary motivator, Md Zani et al. (2011) argue that its impact is often temporary and therefore recommend non-financial motivators such as recognition and praise, which have a longer-lasting intrinsic value. According to the Center for Talent Innovation, money is not a significant motivator, and employee appreciation through acknowledgment and saying thank you can help employees feel valued and appreciated (Hewlett, 2012).

Project Staff

In addition to an effective team, Bawa and Watson (2017), Knowles and Kalata (2008), and Major et al. (2014) recommend involving administrators and managers in the development process of online courses. These groups can provide SMEs with opportunities for education awards, reduced teaching times, and/or monetary compensation (Knowles & Kalata, 2008; Major et al., 2014). In addition, administrators and managers can provide additional resources, staff, or hardware to resolve potential problems (Bawa & Watson, 2017).

Documentation Practices

Simplifying documentation and standardizing requests can ensure that team members comprehend what is being asked and can expedite the process of transforming basic input into usable content (Chen & Carliner, 2021). This can be achieved in several ways. Chao et al. (2010) recommend implementing procedures and guidelines that define tasks, expect performance, and create responsible personnel. Carré (2015) suggests providing best practice example documents for individuals to choose from that best suit the role and process. Campbell et al. (2009) propose using narrative inquiries to help both the ID and SME understand each other's motivations and needs thus establishing reciprocal relationships. Liu et al. (2007) advise organizations to facilitate the onboarding of novice IDs and SMEs by providing tips, expectations, specific role identifications, and detailed instructions.

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Relationship Hindrance Considerations

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Obstacles and challenges can hinder interpersonal effectiveness and cause conflict to arise regardless of one's relationship skill level (Anderson, 2010). According to Shockley-Zalabak (2009), a supportive environment can lessen defensiveness and empower both parties to work together to resolve issues. Accurately identifying and being aware of existing challenges can lead to a quicker resolution. Some of these obstacles are described below.

Unclear Role Designation

Unclear role designation occurs when the SME is uncertain about roles in the process and services provided, specifically involving the ID (Pan & Thompson, 2009). Clear role definitions can help prevent wrong assumptions about the ID's role, which is not limited to the technical support of production tools but rather primarily involves assisting with pedagogy (Chen & Carliner, 2021). If SMEs are unaware of the ID's value, it may lead to problems with listening to

the ID's suggestions or sharing course information (Chen & Carliner, 2021). This can create a negative cycle where the ID feels ignored or underestimated, and as a result, their enthusiasm decreases, causing the quality of work to suffer (Xu & Morris, 2007). This ambiguity can hinder all projects, but it is particularly true in new teams (Stevens, 2013).

Ineffective Communication

To ensure effective collaboration between SMEs and IDs, it is important to have clear and concise communication (Stevens, 2013). The use of technical terms or jargon that is not familiar to both parties can lead to unintended misunderstandings, making it difficult to comprehend the prototypes and plans presented by the ID (Hixon, 2008). Additionally, poorly explained expectations, infrequent communication, and differences in communication styles can create tension in work relationships, resulting in less effective teamwork and a time-consuming process (Chen & Carliner, 2021).

Excessive Workload

IDs and SMEs are frequently tasked with multiple projects and responsibilities, which require prioritization of their work (Carré, 2015). This can result in conflicting deadlines, forcing them to allocate insufficient time to lower-priority projects and possibly jeopardizing quality (Bawa & Watson, 2017). If team members are unable to devote enough time to the course development process, IDs may encounter difficulties in creating a high-quality product (Kang, 2001).

Concern for Academic Autonomy

SMEs may consider the loss of autonomy in course design as a concern (Cowie & Nichols, 2010), which can lead to difficulties in making collaborative decisions and a feeling of

loss of control and creativity (Pan & Thompson, 2009). IDs may also feel a lack of authority and power if SMEs reject their suggestions (Chen & Carliner, 2021). To ensure quality work, it is vital to understand that neither has sole ownership of the final product, and the design team must work collaboratively to achieve a high-quality outcome (Chen & Carliner, 2021).

Teamwork

It is essential to understand the difference between groups and teams (Andrade, et al., 2021). Groups are characterized by individuals with varied skills, individual accountability, and sharing of information (Andrade, et al., 2021). In contrast, teams emphasize complementary skills, mutual accountability, a common purpose/approach, and collective performance (Andrade, et al., 2021). Teams must be actively structured, managed, and involve coaching and leadership skill development, while groups are used for unstructured projects. According to Kinicki and Kreitner (2008), "the essence of a team is common commitment. Without it, groups perform as individuals; with it, they become a powerful unit" (p.1). Effective teams are not coincidental; they are developed through intentional effort (Bates, 2014).

Goals, leadership, and member interaction are common denominators of teams with each element needing to be skillfully executed to achieve success. Clearly stated goals provide purpose and eliminate confusion, and repeated clarification of desired outcomes can optimize decision-making and enhance team effort (Bates, 2014). Leadership is crucial in providing direction and stability to the team, and successful project managers need to exercise influence in a way that builds and sustains trust (Gray & Larson, 2006). Cooperative negotiation of beliefs and expectations is also important for effective content production and integration into learning experiences (Diercks-O'Brien, 2002). Each team member should engage in self-examination to become aware of the conditions that keep the team functioning effectively (Dyer & Dyer, 2007).

Positive experiences occur when the instructional designer and subject matter expert work as equal partners (Hart, 2018).

Possible Team Threats

Hart (2018) emphasizes the importance of collaboration between an ID and a SME to enhance commitment and work engagement. While team models can help create effective teams, fostering an environment that encourages knowledge sharing involves navigating additional challenges such as diversity, conflict, and change.

Diversity

Cultural diversity has been referred to as a "double-edged sword" that references the trade-off between process gains and losses (Minbaeva, 2021). This author states that with proper management and the introduction of a variety of diversified characteristics, diversity can be a strong advantage leading to a successful product. For example, creativity is directly related to knowledge sharing and cognitive diversity (Men, 2017). Harvesting the benefits of diversity refers to stimulating all team members to fully share their unique perspectives, viewpoints, and beliefs (Leroy et al., 2022). Dyer and Dyer (2007) notes that companies that provide a healthier environment where employees feel safe to express concerns and varying points of view leads to improved decision-making and greater company success (Bratton, 1983). Understanding roles, trust, rapport building, administrative support, and faculty buy-in are important elements in collaboration efforts between the ID and SME diversified skills and viewpoints (Richardson et al., 2019).

Conflict

Wilson (2017) stated, "There has never been a time of greater conflict between members of newly formed teams than in today's world of cyclonic corporate change, where relationships are made and changed through global mergers, demergers, portfolio careers, cost-cutting redundancies and a widespread lack of ability in organizations to nurture and retain their home grown talent" (p. 1). Conflict is either a catalyst toward unsupportive, abusive, or toxic behavior; or a stimulus for creativity depending on how it is managed (Shockley-Zalabak, 2009). If left unresolved, it can lead to lower productivity, frustrated employees, and unwanted attrition (Penttila, 2009).

In a qualitative study of instructional designers, Hart (2018) found that conflicts sometimes arose due to personality clashes, pushback regarding recommendations from ID, and delays in submission timelines. Unfortunately, there were no established processes for managing conflicts (Hart, 2018). How individuals view elements of conflict, the causes of the conflict, and the reason for conflict escalation is important to understand so one can ascertain the best resolution (Deutsch et al., 2006). However, there are frequently no established processes for managing conflicts between IDs and SMEs when one or both feel superior and do not appreciate the unique expertise of the other (Deutsch et al., 2006).

Several things can be done to manage and prevent negative team conflict. Clear communications, explanations, and programs to help build understanding can be instituted at a management level (Deyoe & Fox, 2012). Trust can be built to assist in clashes that can result as two experts (SME and ID) have competing ideas (Lavin et al., 2007). Relationships can improve as the ID puts forth the effort to gain credibility and build rapport with the SME (Hart, 2018). Critical thinking and observation can be encouraged to improve resolution skills followed by a

focus "on fixing the problem by apologizing for your behavioral flaws, advertising your efforts to change, listening to the input of others, showing gratitude for others' contributions to your change process, and following up on your progress" (Daft, 2008, p. 109).

Change

Change is often viewed as a difficult process that must be endured; however, some level of change should always be present to improve processes and efficiency (Jones, 2007). Effective organizations depend on analysis and adaptation to the existing environment (Jones, 2007). Anderson (2010) describes change as "the vehicle to everything better, the essence of improvement, innovation, growth, expansion, and evolution" (p. 18). However, Staren and Eckles (2013) warn leaders to consider the various components of the organization and the impact before implementing any type of change.

<div align="center">

Summary

</div>

Richardson et al. (2019) emphasize that successful collaboration and production of high-quality course materials require an understanding of the distinct roles and responsibilities of IDs and SMEs, along with strong relationship skills. The authors assign the responsibility of promoting effective collaboration and establishing a relationship of reciprocity, openness, and trust to the ID, who must prioritize goals, leadership, and member interaction (Bates, 2014). It is crucial to value diversity and organizational culture, allowing every member to contribute their unique skills and perspectives to the project (Shockley-Zalabak, 2009).

However, not all individuals may be prepared or enthusiastic about working in a team environment (Hart, 2018). Even well-designed teams can face potential threats that need to be navigated, as IDs and SMEs may have differing viewpoints and skill sets. Diversity can be a double-edged sword, potentially causing additional conflict or providing added perspectives that

enrich the team's work (Minbaeva, 2021). To effectively extract knowledge, it is essential to understand how to manage conflicts and have measures in place if issues arise (Deyoe & Fox, 2012). As one or both members begin to adapt their thoughts and actions towards a collaborative effort, the other member is likely to follow. Wilmot and Hocker (2007) suggest that changing one individual's communication or thoughts can alter the entire system.

CHAPTER III: METHODOLOGY

Business and academia share a reliance on research, but the definition of research may vary based on perspective (Amaratunga et al., 2002). Despite this, it is commonly accepted that research involves a systematic inquiry and investigation intended to enhance knowledge (Amaratunga et al., 2002). Researchers must utilize suitable methods that are relevant to the research questions at hand to effectively accomplish this (Amaratunga et al., 2002).

This dissertation aimed to investigate the significance and frequency of capability and suitability factors in the successful extraction of knowledge from the perspective of IDs. To answer these research questions, a quantitative research approach was chosen as it involves empirical investigation, utilizes robust sampling techniques and a sufficiently large sample size to draw conclusions about the population, establishes correlations between variables, and conducts comparative research (Creswell, 2009). This chapter outlines the specific methodology, techniques, and procedures that were used in this study.

Purpose of Study

The objective of this research was to pinpoint the SME capability and suitability factors that instructional designers consider important but currently lacking for effective knowledge extraction. The outcome of this study has provided valuable insights to enhance the knowledge extraction process and SME/ID teamwork, leading to improved information delivery.

Research Questions

This study aimed to identify and address the frequency and importance of capability and suitability factors necessary for effective knowledge extraction. The following research questions guided this dissertation project:

RQ1: How frequently have instructional designers encountered the capability and suitability factors in previous knowledge extraction?

RQ2: What capability and suitability factors do instructional designers consider important for effective knowledge extraction?

RQ3: Which capability and suitability factors do instructional designers consider to be lacking for effective knowledge extraction to occur?

Research Design

The purpose of research is to answer questions, guide the study, and explain variations in quantitative results or qualitative observations (McGaghie et al., 2001). The authors emphasize the research design's importance as it helps the researcher focus on the questions and follow a systematic process through data collection, analysis, and interpretation. Toledo-Pereyra (2012) notes that an appropriate research design is crucial to obtain the best possible results, starting with well-defined research questions and data collection variables. Only after these are established should the researcher consider an optimal research design (Toledo-Pereyra, 2012).

Given the primary objective of this study, which was to determine the preferences and perceptions of ID professionals, a survey design seemed most appropriate to collect the

necessary information. Survey research methods use questionnaires, sampling polls, and interviews to collect data that is then analyzed and typically presented as percentages (Alreck & Settle, 2004). Surveys can be conducted via various modes such as phone, email/mail, in-person, or online and can be used to examine one or multiple groups (Alreck & Settle, 2004). In this study, IDs were asked to answer a survey accessed through an online portal to determine their experience and the importance placed on various capability and suitability factors in knowledge extraction. After collecting the data, a statistical analysis was conducted to determine the mean of each factor and to identify any significant differences using the Kruskal-Wallis H and Mann-Whitney U tests.

Population and Sample

Organizations, LinkedIn groups, and Facebook groups of instructional designers were invited to participate in this study. The organizations listed in Table 1 comprise professional groups of IDs and are representative of varying industries and levels of educational attainment.

Table 1
Organizations

Organization Name	Type	Created	President	Members
Association for Educational Communications & Technology	Professional	1923	David Wiley	10,000
Association of Talent Development	Professional	1943	Jim Caprara	Nearly 40,000

LinkedIn groups listed in Table 2 were also invited to participate. These groups consist of groups specific to instructional designers and are representative of varying industries and levels of educational attainment.

Table 2
LinkedIn Groups

Group Name	Group Type	Created	Owner	Members
Instructional Designer	Networking	2016	Shafeek Najimudeen	6,191
Curriculum Developer & Instructional Technologist/Designer	Networking	2008	Gainford Amponsah	1,031
Instructional Designer- Information/Jobs	Networking	2008	Kranthi Kumar	217

Table 3 consists of Facebook groups that were also invited to participate. These groups also consist of groups specific to instructional designers and are representative of varying industries and levels of educational attainment.

Table 3
Facebook Groups

Group Name	Group Type	Created	Owner	Members
Instructional Designers in Education	Networking	2017	Heather Dodds & Peter Shea	16,681
Instructional Designer	Networking	2011	eLearning Industry, Sofia Konstantzou, Christopher Pappas	26,740
Instructional Design Discussion	Networking	2019	Susan Woodard & Robin Bagent	5,034

Each organization received an email (See Appendix A) explaining the study and process in the hopes of gaining their participation. Permission was also sought from Facebook and LinkedIn groups consisting of instructional designers to join their groups and, if applicable, to post an explanation and link to the survey (See Appendix C).

Instrumentation

An online survey was used to collect responses (See Appendix D). The survey was adapted from the instrument described in the Instructional Developers' Survey and Results section of the article *Designing and Developing Technical Curriculum: Finding the Right Subject Matter Expert* (Mattoon, 2005). The author's research included questions regarding SMEs' weaknesses and strengths in relation to six SME factors, three capability factors (breadth of knowledge, depth of knowledge, and articulation skills), and three suitability factors (availability, interpersonal skills, and attitude). Other multiple-choice demographic questions such as age, level of education, and design sector were used to analyze the responses of particular groups to find correlations. Two expert reviews also occurred as Dr. John Curry did an expert review on the instrument's content while Dr. David Coffland reviewed the proposed assessment procedure.

After evaluating accessibility, speed, participant rate, and cost, the decision was made to use an online survey approach. As noted by Bhutta (2012), online surveys are a cost-effective and efficient method that requires minimal assistance, while still eliciting responses that maintain important correlations found in standard surveys conducted by Gallup and the GEE.

Encouragement to participate posts (See Appendix C) and an informed consent survey statement (See Appendix E) were distributed through LinkedIn and Facebook groups. Eliciting the participants of several groups representing a variety of industries and locations produced a broader, more accurate understanding of the research questions.

The survey itself included multiple-choice, Likert scale, and an open-ended question and was broken into two parts. The first section was used to find the frequency and importance of

specific SME factors used in knowledge extraction and the second section was designed to collect demographic information.

To encourage cooperation from the interviewees, the survey questions were phrased positively and designed to be courteous, encouraging, and emphatic. This survey did not include leading questions as Alreck and Settle (2004) warn that these types of questions encourage the respondent to answer in a particular way and create a strong bias that is likely to result in invalid data. The open-ended questions were included to give the interviewees an added opportunity to provide input about the survey content and the direction of their responses. Alreck and Settle (2004) explain that both open-ended and leading questions elicit answers not provided by the survey; however, leading questions tend to be yes or no answers while open-ended answers contain more sustenance.

Instrument Validity and Reliability

During the planning phase of a quantitative research project, it was important to address potential challenges that may arise, as failure to do so can compromise the integrity of the results (Creswell, 2009). Several of these challenges addressed lie in how the research was conducted, such as:

- Biased wording/order of survey questions.

- Inadequate sample in which certain groups are underrepresented or overrepresented relative to others in the population.

- Observer bias in recording and analyzing information from the study.

- Inadequate reflexivity during each step of the research process.

Quantitative research uses measures of reliability to ensure the results are consistent, meaning the instrument (under the same circumstances) holds consistent measurements if repeated when measuring the construct (Oliver-Hoyo & Allen, 2006). To ensure this research was reliable, the researcher did the following:

- Used unbiased wording/order of questions.

- Pursued and collected a large enough sample in the target demographic.

- Created and followed a rigorous research design by using appropriate research tools to meet the stated objectives of the investigation.

- Used care in the execution and interpretation of data.

- Obtained two expert reviews: Dr. John Curry on the instrument's content and Dr. David Coffland on the proposed assessment procedure.

Confidentiality of Participants and Data

Creswell (2013) noted that a researcher will face many ethical issues during data collection/analysis regardless of the approach taken. These ethical issues could lie in "informed consent procedures; deception or covert activities; confidentiality toward participants, sponsors, and colleagues; benefits of research to participants over risks; and participant requests that go beyond social norms" (p.175). To curtail problems, the researcher reviewed and adhered to standards from the American Psychological Association (2017).

To ensure confidentiality, appropriate measures were taken including secure storage of confidential information, a detailed explanation of the study's purpose to participants, and removal of off-the-record disclosures from the analysis. To protect anonymity, participant names were not collected, and no physical contact was made. The study's results were presented only as

summary data, and no individually identifiable information was disclosed. If information was quoted in the written results, pseudonyms or codes were used to maintain confidentiality. Furthermore, participant information was collected through an online survey company (Qualtrics), and the collected data was secured using password protection on the researcher's personal computer. Collected survey data was stored securely on servers maintained by Qualtrics. The data will be retained for one year and will then be purged.

Data Collection and Analysis Procedures

The organizations identified and pertinent LinkedIn and Facebook groups received an email or posting explaining the purpose of the study, participant criteria, and a survey link. No organizations participated; however, if they had, they would have received an additional email directed to their membership representative detailing the study (See Appendix B). This email included the survey (See Appendix D), informed consent information (See Appendix E), the researcher's contact information, and a link to the online survey.

Facebook and LinkedIn groups received a post that they were able to approve/disapprove with a short explanation and a survey link. As the members access the survey, a brief introduction and consent information was available to read. Informed consent was given by the participant clicking on the *Yes* button to proceed to the survey. The survey was anonymous and touched on areas of subject matter expert capability and suitability factors and demographic information.

After the information was collected, the first analysis evaluated whether the participants were representative of the desired population and whether all information needed was collected.

Data from demographic questions (e.g., the highest level of education, gender, ethnic background, experience, etc.) was included in the survey to compare participants against other samples to determine whether this sample was representative of the larger population, or for use in possible future samples. Frequency and other descriptive statistics were also used and compared against national demographics to understand limitations and validate the measure. In addition, comparisons were made to further understand the sample such as gender (Q9), race (Q10), level of formal education (Q8), years of ID experience (Q11), and design sectors (Q12).

Next, the researcher reviewed and assessed questions regarding the collected data. The first six research questions were designed to uncover the frequency and importance of SME factors. IDs were asked to rate each factor in connection to their knowledge extraction experience and their opinion of the factor's importance during the knowledge extraction process. The researcher then sought further clarification of the importance of factors in the form of an open-ended question (Q7). RQ1 required an analysis of the IDs' previous experience working with SMEs (Q1a-Q6a; Table 4). RQ2 required the analysis regarding the ID's perceived importance on each of the factors (Q1b-Q6b; Table 4) and seeks further clarification in the form of an open-ended question asking for another factor not previously listed (Q7). Further analysis compared the IDs' experience and importance levels with other demographic questions to understand trends.

The last research question was designed to discover IDs' insights regarding SME factors they perceive as lacking to achieve effective knowledge extraction. This was answered by comparing the ratings of frequency of the six factors (Q1a-Q6a) with the level of importance (Q1b-Q6b). These same six factors (Q1-Q6) were used when coding the open-ended, follow-up

level of importance question (Q7; Appendix F) in hopes of further understanding any additional factors missed for all three research questions.

An analysis was performed to determine if the survey was reliable and whether the participants were representative of the larger population. Comparisons were also made to further understand the sample such as the gender, race, years of design experience and sector, and education completed. A statistical analysis was then conducted to determine the mean of each factor and to identify any significant differences using the Kruskal-Wallis H and Mann-Whitney U tests. The analysis of the open-ended question was a rudimentary analysis of possible categories of other factors.

Table 4
Research Question Analysis

Research Questions	Data Collection Method	Analysis
RQ1	Multiple Choice, Open Ended	Analysis of the IDs' perceived frequency of SME factors. Additionally, an open-ended question asking for additional factors not previously listed and an explanation of their inclusion.
RQ2	Multiple Choice, Open Ended	Analysis of the ID's perceived importance of SME factors. Additionally, an open-ended question asking

		for additional factors not previously listed and an explanation of their inclusion.
RQ3	Multiple Choice, Open Ended	Analysis comparing the ratings of frequency of the six factors (R1) with the level of importance (R2) to discover IDs' insights regarding SME factors they perceive as important but currently lacking in frequency.
Demographic	Multiple Choice	Evaluate whether participants are representative of the desired population and if all information was collected. Further analysis to compare the IDs' experience and importance levels (RQ1 & RQ2) with other demographic questions to understand trends.

Limitations

Quantitative research has challenges and limitations that should be recognized and addressed during the project's planning phase. If not addressed, these challenges can affect the integrity of the results. Quantitative research uses reliability to ensure consistent results, meaning the instrument (under the same circumstances) holds consistent measurements if repeated when measuring the construct (Oliver-Hoyo & Allen, 2006). This study's limitations included:

- The survey was only collected for a short period which may not have allowed access for all who would like to participate.

- The survey was collected by convenience sampling; therefore, interviewees do not represent the entire ID population. This may lead to biased opinions.

- The survey only collected IDs' perceptions of factors' frequency and perceived importance. This may not align with what happened or what is important.

- It is likely that only those with strong positive and/or negative opinions responded causing non-response bias.

- The participant's mood, satisfaction levels, life circumstances, or current national/local news stories may have caused variance in responses.

- Respondents may have had differing backgrounds/education that may vary with other pools of participants.

- The interpretation of data and instruments was based on the researcher's analysis.

Summary

This chapter outlined the methodology that was used to conduct this dissertation research project investigating instructional designers' experience and opinions of capability and suitability

factors in an attempt to improve the knowledge extraction process. An online instrument based on previous research (Mattoon, 2005) was used; however, this survey was modified to ensure more data regarding instructional designers' experiences. Confidentiality of participants and data was accomplished through an anonymous survey and password-protected files. Finally, an analysis was made by comparing various questions to discover correlations.

CHAPTER IV: RESULTS

This study sought to identify important but lacking SME factors for effective knowledge extraction as perceived by instructional designers. Data was collected through an online survey posted in three Facebook groups (Instructional Designers in Education, Instructional Designer, and Instructional Design Discussion) and one LinkedIn group (Instructional Designer), resulting in a total of 126 complete responses.

The survey provided valuable insights into the respondents' experiences working with SMEs and their opinions on the factors necessary to improve knowledge extraction and collaboration. The research findings have implications for enhancing the knowledge extraction process and fostering collaboration between SMEs and instructional designers, ultimately leading to improved information delivery. These insights, combined with appropriate team models and relationship strategies, can optimize outcomes, and mitigate potential issues.

Research Questions

The research and survey data contained in this dissertation yielded insights about the following research questions:

RQ1: How frequently have instructional designers encountered the capability and suitability factors in previous knowledge extraction?

RQ2: What capability and suitability factors do instructional designers consider important for effective knowledge extraction?

RQ3: Which capability and suitability factors do instructional designers consider to be

lacking for effective knowledge extraction to occur?

Methodology and Design

The primary objective of this study was to investigate the importance and frequency of

capability and suitability factors in knowledge extraction from the perspective of IDs. Invitations

to participate were sent to two professional organizations, namely the Association for

Educational Communications and Technology (AECT) and the Association of Talent

Development (ATD). However, the AECT was not currently sending out dissertation survey

invitations, and the ATD did not respond. Additionally, two LinkedIn Groups, namely

Curriculum Developer & Instructional Technologist/Designer and Instructional Designer-

Information/Jobs, also did not respond. An online survey invitation was posted in the remaining

Facebook groups (Instructional Designers in Education, Instructional Designer, and Instructional

Design Discussion) and LinkedIn group (Instructional Designer).

The responses received were evaluated to assess their representativeness in relation to the

larger population and the research questions. Research Questions 1 and 2 focused on the

experience and importance levels of IDs regarding subject matter experts. These questions

explored how often SMEs demonstrated certain factors and how important these factors were

perceived to be. To address Research Question 3, these same factors were further analyzed to

determine the most and least frequently observed factor, the most and least important factor, and

the factor that was perceived as most and least lacking. Additionally, respondents were given the

opportunity to provide further insights through an open-ended question, allowing them to

mention and explain other skills or factors they believed influenced the knowledge-extraction

experience. The collected open-ended responses were carefully categorized into six distinct categories. Furthermore, the SME factors were analyzed in conjunction with the demographic data that was collected, providing additional information and insights.

Population and Sample

The researcher collected a total of 126 completed responses that were analyzed and evaluated. The demographic responses were compared to national data as applicable and then analyzed in conjunction with the capability and suitability factors (Q1a-Q6b; Appendix D).

Gender

Respondents were presented with four gender categories: male, female, nonbinary/third gender, and prefer not to say (Q9; Appendix D). Among those who provided their gender, 17.5% identified as male ($n = 22$), 79.4% identified as female ($n = 100$), none identified as nonbinary/third gender, and 3.2% ($n = 4$) preferred not to disclose their gender. A total of 126 responses were recorded for this question (refer to Figure 1). It is worth noting that this gender distribution significantly deviates from the gender ratio in the United States population, where females make up approximately 50.5% (United States Census Bureau, 2022).
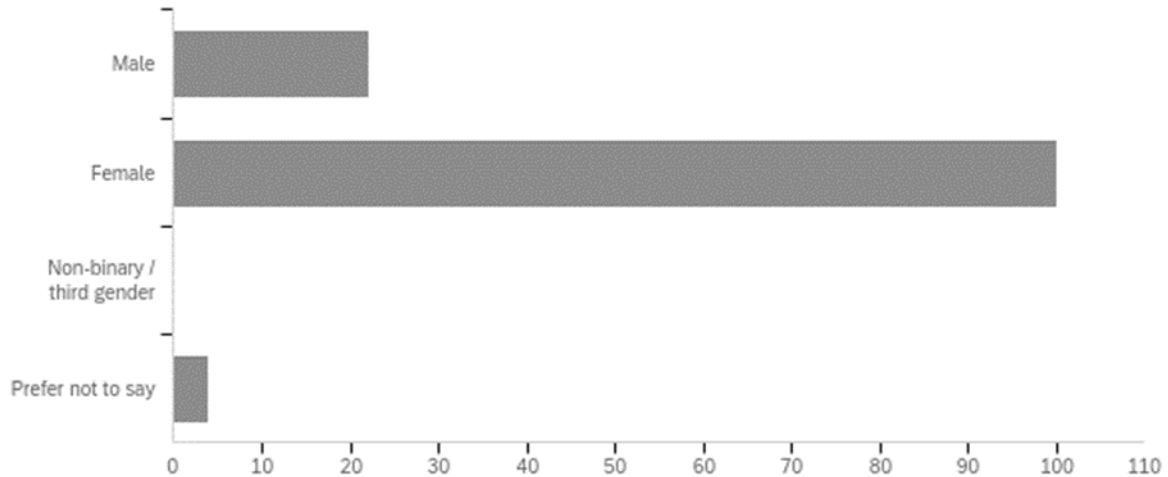
Figure 1 Distribution of Respondents by Gender

A Kruskal-Wallis H test was conducted to analyze the relationship between Gender and the perceived frequency and importance of the six SME factors. Notably, the p-value of 0.019 suggests a significant difference in the importance attributed to Articulation Skills by IDs of different genders. Males (4.273) considered articulation skills more important than females (3.910).

Race

The survey also provided respondents with options to select one or more races they identify with, which included: White or Caucasian, Black or African American, American Indian/Native American or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, and other (Q10; Appendix D). The most chosen category was White or Caucasian, comprising 79.7% ($n = 102$) of the respondents. Black or African American accounted for 3.9% ($n = 5$), there were no responses for American Indian/Native American or Alaska Native, Asian represented 6.3% ($n = 8$), Native Hawaiian or other Pacific Islander accounted for 0.8% ($n = 1$), the other category comprised 2.3% ($n = 3$), and 7% ($n = 9$) preferred not to disclose their identified race.

Unfortunately, the survey did not include options specifically for Hispanic and Non-Caucasian respondents. It is worth noting that this racial distribution only slightly differs from the United States population estimates as of July 1, 2022, where Whites comprise 75.8%, Black or African American accounts for 13.6%, American Indian/Native American or Alaska Native represents 1.3%, Asian makes up 6.1%, and Native Hawaiian or other Pacific Islander constitutes 0.3% (United States Census Bureau, 2022).
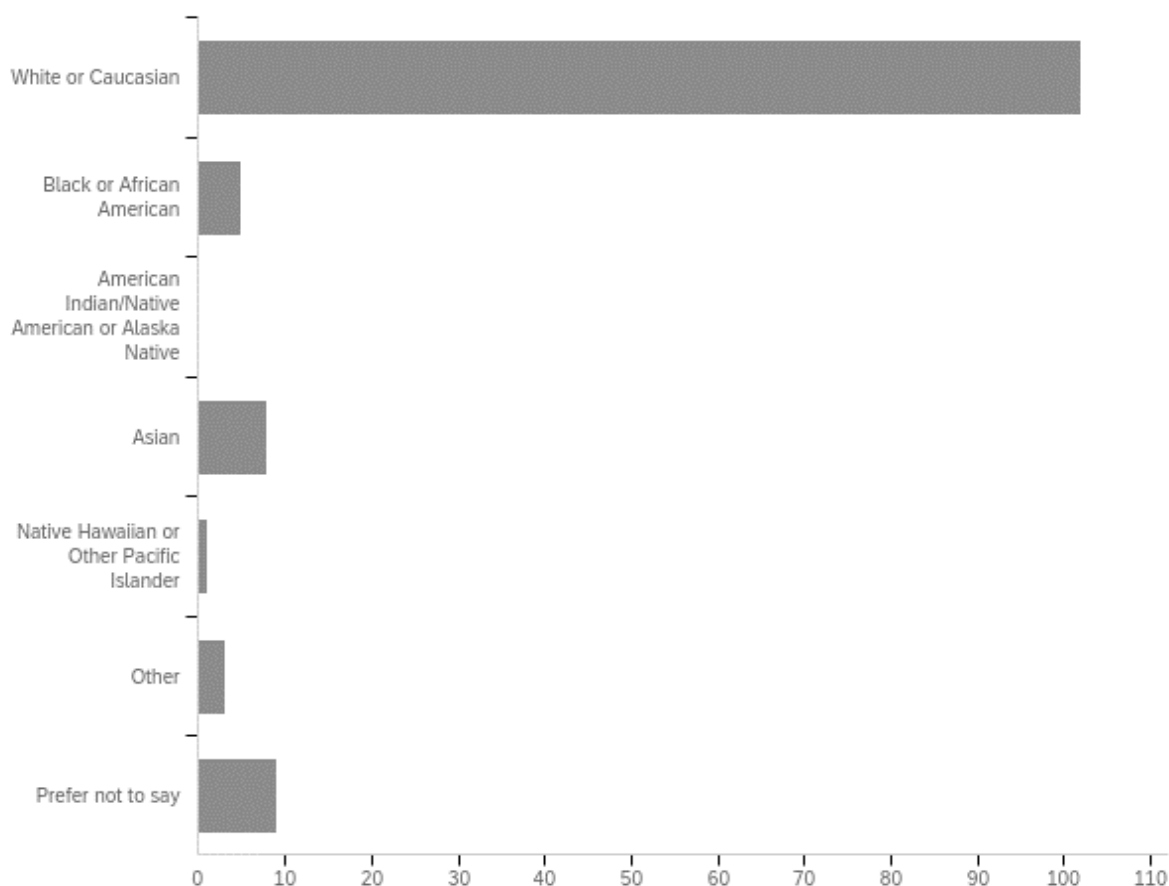
Figure 2 Distribution of Respondents by Race

A Mann-Whitney U test was conducted to evaluate the association between Race (Q10; Appendix D) and the six SME factors. The p-value of 0.006 indicates a significant difference in the perceived frequency of the Availability of SMEs. In their experience, non-white (3.73) instructional designers reported more availability of SMEs at a higher rate than white IDs (3.20).

Formal Education Attainment

The survey provided respondents with the following education categories: less than high school, high school or GED, some college, 2-year degree, 4-year degree, professional degree, and doctorate (Q8; Appendix D). When considering the highest level of formal education completed, all respondents had completed at least some college education. Specifically, 2.4% (n = 3) reported having some college education, 0.8% (n = 1) held a 2-year degree, 12% (n = 15) possessed a 4-year degree, 64.8% (n = 81) had a professional degree, and 20% (n = 26) held a doctorate. There was a total of 126 responses to this question (refer to Figure 3). It is noteworthy that this education distribution significantly deviates from the educational attainment ratio in the United States population, where only 33.7% of individuals aged 25 years and older have a bachelor's degree or higher (United States Census Bureau, 2022).
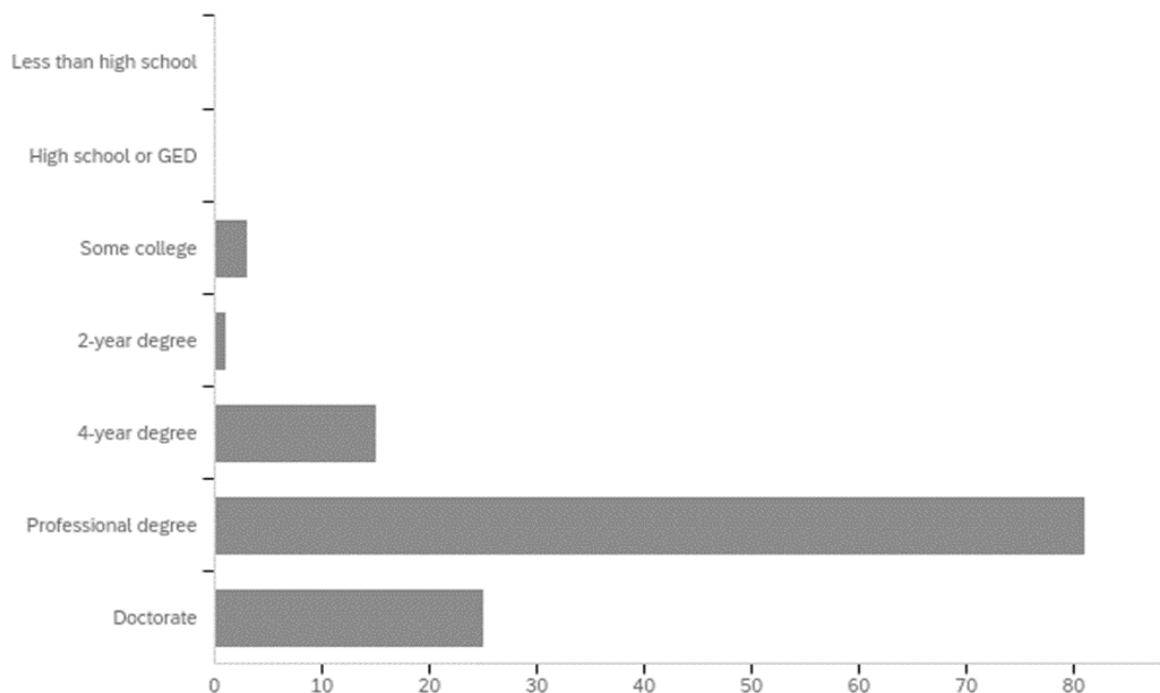
Figure 3 Distribution of Respondents by Formal Education Attainment.

A Kruskal-Wallis H test was conducted to examine the relationship between Formal Education Attainment (Q8; Appendix D) and the perceived frequency and importance of the six SME factors. The analysis revealed no significant evidence to indicate that this variable has a substantial impact on any of the six SME factors under investigation.

Instructional Design Experience

Regarding instructional design experience, respondents were presented with the following categories: 1-5 years, 6-10 years, 11-15 years, 16-20 years, 21-25 years, and 26+ years (Q11; Appendix D). The distribution among respondents was as follows: 25.6% had 1-5 years of experience ($n = 32$), 31.2% had 6-10 years of experience ($n = 39$), 21.6% had 11-15 years of experience ($n = 27$), 9.6% had 16-20 years of experience ($n = 12$), 10.4% had 21-25 years of experience ($n = 13$), and 1.6% had 26+ years of experience ($n = 3$). There was a total of 126 responses to this question (refer to Figure 4).
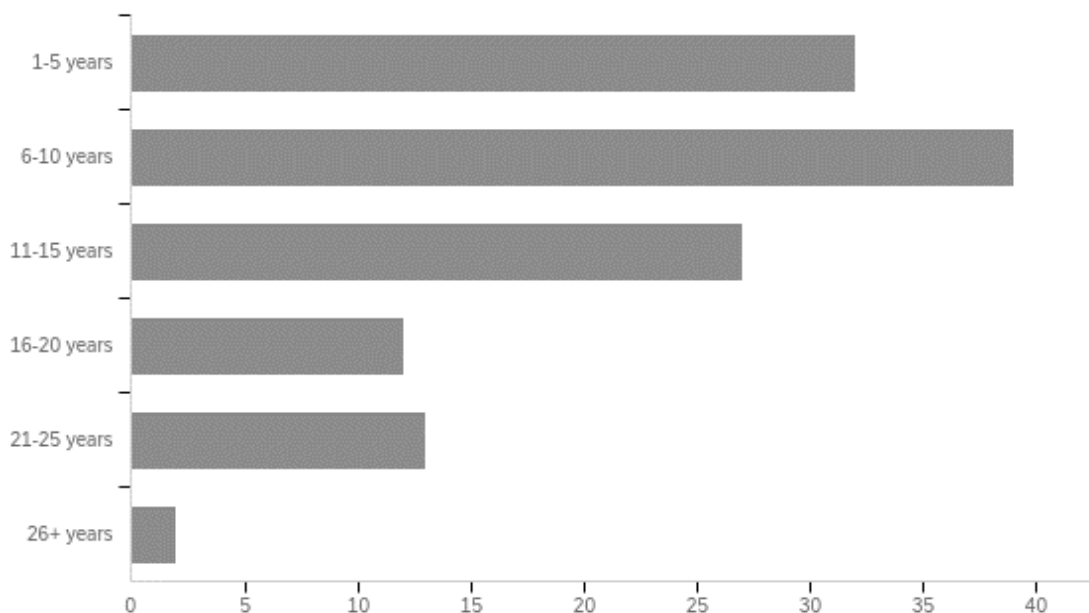
Figure 4 Distribution of Respondents by Instructional Design Experience.

A Kruskal-Wallis H test was performed to compare Instructional Design Experience with the perceived frequency and importance of the six factors. It is worth noting that no significant evidence was found to indicate that Instructional Design Experience has a significant impact on any of the six SME factors being studied.

Design Sectors

The survey offered respondents options to select one or more sectors in which they had experience designing, including K-12 education, higher education, business and industry, government/military, private consultant, and other (Q12; Appendix D). The sectors with the highest response rates were higher education and business/industry, both receiving 33.2% ($n =$ 67) of the responses. Private consultant had the next highest response rate at 10.9% ($n = 22$), followed by K-12 education and government/military, each receiving 9.9% ($n = 20$). The other category accounted for 3% of the responses ($n = 6$). In total, there were 202 responses to this question (refer to Figure 5). Several Kruskal-Wallis H and Mann-Whitney U tests were conducted to examine the relationship between Design Sectors (Q12; Appendix D) and the SME factors (Q1a-Q6b; Appendix D). These results are found in each of the capability and suitability factors discussed below.
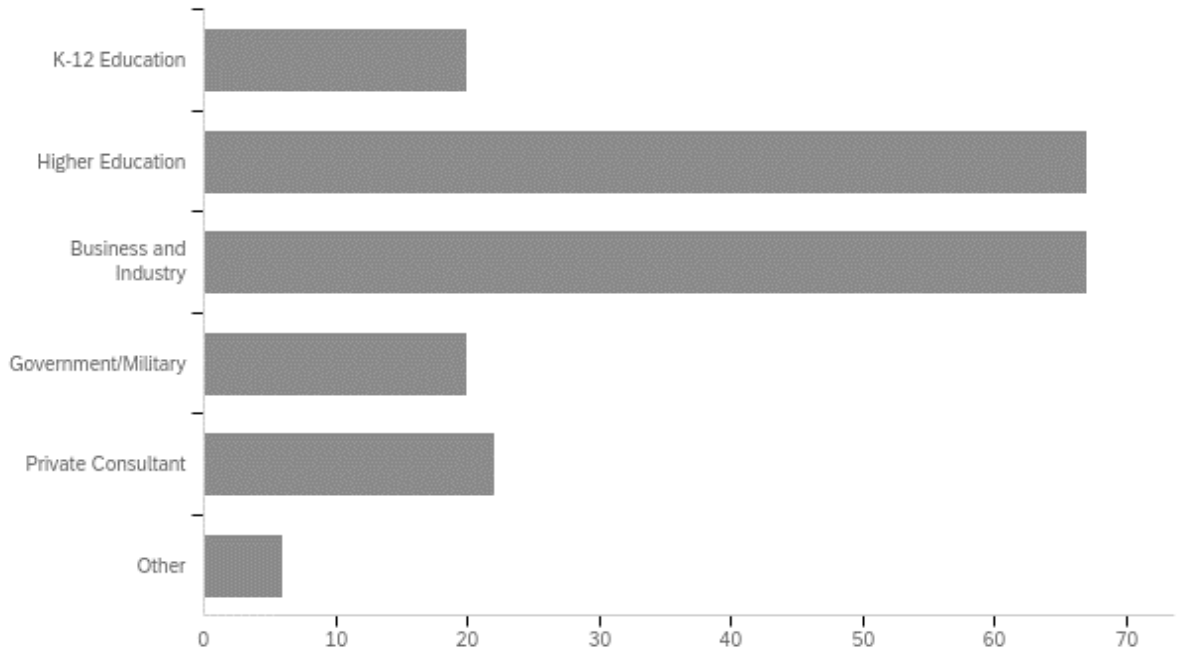
Figure 5 Distribution of Respondents by Experience in Design Sectors.

Capability and Suitability Factors

The primary focus of the first six questions in the survey is to evaluate the frequency and perceived importance of capability and suitability factors. These factors consist of three capability factors: breadth of knowledge, depth of knowledge, and articulation, as well as three suitability factors: availability, interpersonal skills, and attitude.

Capability Factors

Capability factors encompass three key aspects: breadth of knowledge, depth of knowledge, and articulation skills. The breadth of knowledge pertains to the subject matter expert's formal education in the relevant field, while the depth of knowledge relates to their

practical experience in the specific topic area. Articulation skills, on the other hand, refer to the ability to effectively communicate and convey information about the subject matter.

Breadth of Knowledge

Participants were asked about the frequency with which SMEs have demonstrated Breadth of Knowledge, defined as "…formal education acquired in the associated field of topic" (Q1a; Appendix D). Respondents were provided with the following response categories: never, rarely, sometimes, often, and always. The majority of respondents indicated that SMEs often demonstrated this factor, with only 0.8% answering never ($n = 1$), 3.7% answering rarely ($n = 5$), 26.9% answering sometimes ($n = 34$), 45.5% answering often ($n = 60$), and 23.1% answering always ($n = 31$). Refer to Figure 6.
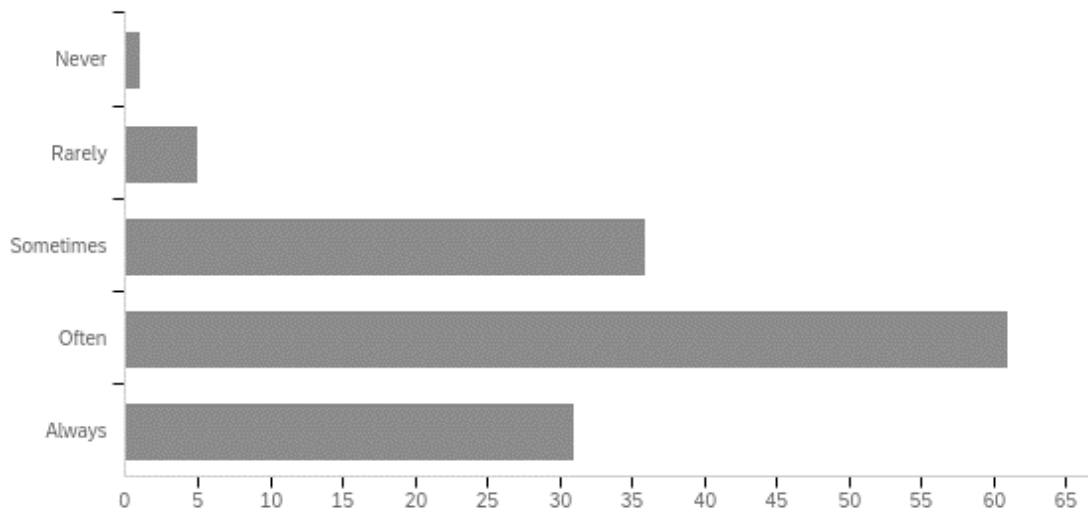
Figure 6 Breadth of Knowledge Frequency.

Several Kruskal-Wallis H and Mann-Whitney U tests were conducted to examine the relationship between the Breadth of Knowledge and different Design Sectors (Q12; Appendix D). Among the sectors investigated, Higher Education exhibited a statistically significant

difference, as indicated by a p-value of 0.024. This suggests that subject matter experts involved in collaboration for Higher Education (4.045) demonstrate a distinct level of Breadth of Knowledge compared to experts in other sectors (3.712). Notably, no other sectors displayed a significant difference in the frequency of this factor. One could speculate that the Higher Education sector places importance on SMEs with higher formal education qualifications, deals with faculty members who typically possess advanced degrees, prepares courses that require more extensive formal subject knowledge, or a combination of these factors.

Table 5
Breadth of Knowledge Frequency

Variable	P-Value
Demographics:	
Education	0.614
Gender	0.748
Race	0.077
Years of Experience	0.377
Design Sectors:	
Business and Industry	0.061
Higher Education	0.024*
K12 Education	0.699
Private Consultant	0.622
Government/Military	0.715
Other	0.056

Respondents were then asked to rate the importance of the Breadth of Knowledge defined as "…formal education acquired in the associated field of topic" (Q1a; Appendix D). They were given the following response categories: not at all important, slightly important, moderately important, very important, and extremely important. The distribution of responses is as follows: 1.5% indicated that Breadth of Knowledge was not at all important ($n = 2$), 8.2% considered it slightly important ($n = 11$), 22.4% regarded it as moderately important ($n = 30$), 36.6% perceived it as very important ($n = 49$), and 31.3% regarded it as extremely important ($n = 42$). These findings are visually represented in Figure 7 below.
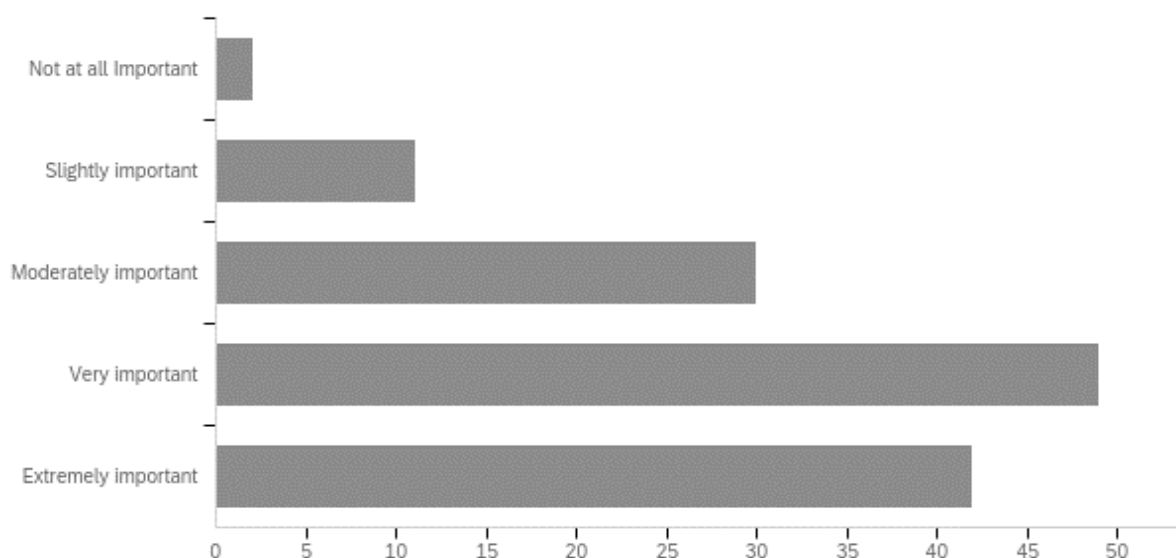
Figure 7 Breadth of Knowledge Importance.

A series of Kruskal-Wallis H and Mann-Whitney U tests were conducted to examine the association between the importance attributed to the Breadth of Knowledge and various variables. Among the sectors analyzed, Business and Industry and Higher Education demonstrated statistically significant differences. The obtained p-values of 0.011 and 0.002, respectively, indicate that instructional designers working in these sectors assign a distinct level

of importance to the Breadth of Knowledge compared to other sectors. Business and Industry perceived Breadth of Knowledge as less important (3.627) than those outside that sector (4.119). However, IDs in Higher Education placed more importance of Breath of Knowledge (4.119) than those not working in Higher Education (3.627).

Table 6
Breadth of Knowledge Importance

Variable	P-Value
Demographics:	
Education	0.805
Gender	0.922
Race	0.088
Years of Experience	0.282
Design Sectors:	
Business and Industry	0.011**
Higher Education	0.002**
K12 Education	0.648
Private Consultant	0.855
Government/Military	0.289
Other	0.229

Depth of Knowledge

In question Q2a (Appendix D), participants were asked about the frequency with which SMEs have demonstrated Depth of Knowledge, with the provided definition as "…experience and application of needed knowledge acquired from working in the associated career field."

Respondents were provided with the following response categories: never, rarely, sometimes,

often, and always. The distribution of responses is as follows: 0.8% had never seen it

demonstrated ($n = 1$), 1.5% had rarely seen it demonstrated ($n = 2$), 16.2% had sometimes seen it

($n = 20$), 55.4% had often seen it ($n = 71$), and 26.2% answered always ($n = 33$). These findings

can be seen in Figure 8.
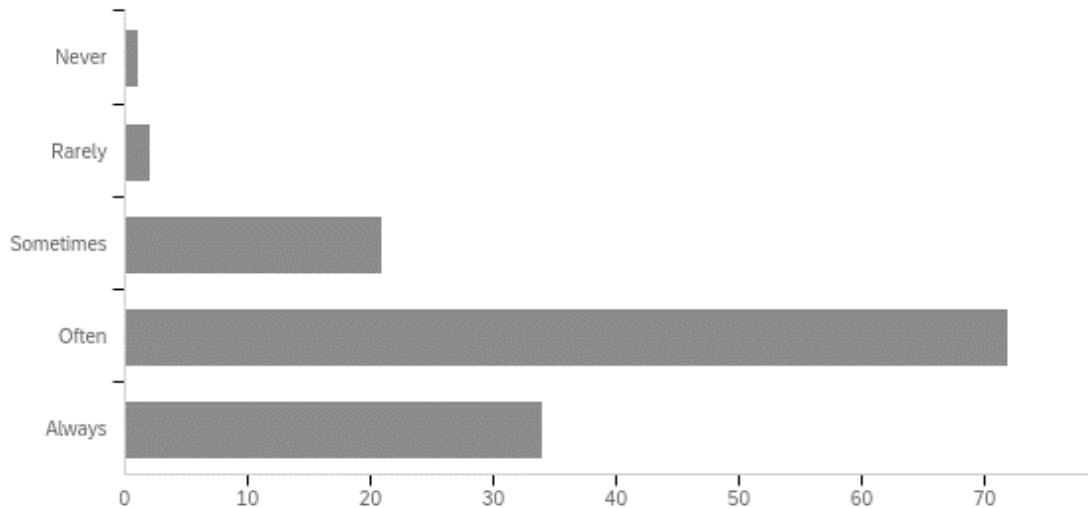
Figure 8 Depth of Knowledge Frequency

Several Kruskal-Wallis H and Mann-Whitney U tests were conducted to assess the

association between the frequency of Depth of Knowledge (Q2a; Appendix D) and demographic

variables. Among the sectors (Q12) examined Business and Industry displayed a statistically

significant difference, with a p-value of 0.035, indicating that subject matter experts working in

this sector exhibit a higher frequency of demonstrating Depth of Knowledge (4.164) compared to

other sectors (3.932). This finding can be contrasted with the frequency and importance

responses related to the Breadth of Knowledge discussed earlier, where individuals in Business

and Industry did not show a significant difference when asked about the frequency of formal

education. It could be speculated that the Business and Industry sector faces challenges in easily

accessing subject matter experts with higher levels of formal education.

Table 7
Depth of Knowledge Frequency

Variable	P-Value
Demographics:	
Education	0.157
Gender	0.514
Race	0.993
Years of Experience	0.229
Design Sectors:	
Business and Industry	0.035*
Higher Education	0.225
K12 Education	0.762
Private Consultant	0.725
Government/Military	0.433
Other	0.363

In question Q2b (Appendix D), participants were asked to provide their opinion on the

importance of the Depth of Knowledge in association with SMEs, which is defined as

"…experience and application of needed knowledge acquired from working in the associated

career field." Respondents were given the following categories: not at all important, slightly

important, moderately important, very important, and extremely important. The breakdown of

responses is as follows: 1.5% found this factor not at all important ($n = 2$), 0.8% found it slightly

important ($n = 1$), 9.2% found it moderately important ($n = 11$), 42.3% found it very important ($n = 54$), and 46.2% found it extremely important ($n = 60$). These results are displayed in Figure 9.
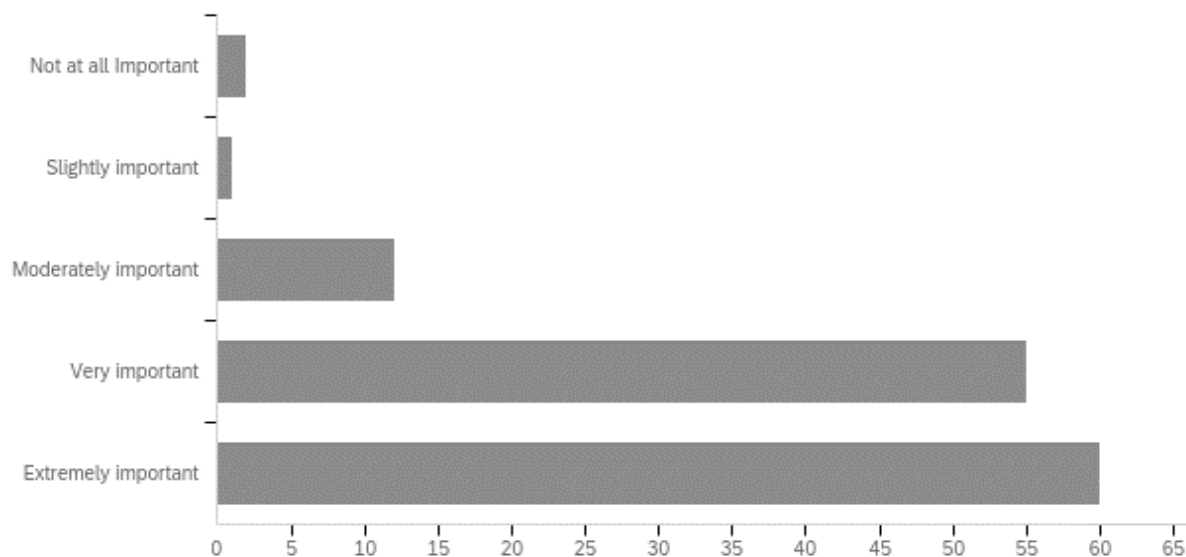

Figure 9 Depth of Knowledge Importance.

Several Kruskal-Wallis H and Mann-Whitney U tests were conducted to assess the association between the importance attributed to the Depth of Knowledge (Q2b; Appendix D) and different demographics and sectors. Among the sectors considered, only Business and Industry exhibited a statistically significant difference, with a p-value of 0.045. This suggests that instructional designers involved in this sector assign a distinct level of importance (4.433) to the Depth of Knowledge compared to other sectors (4.169). Interestingly, Business and Industry demonstrated a significant difference in both the importance of the Breadth of Knowledge (p-value of 0.011) and the Depth of Knowledge (p-value of 0.045). This implies that this sector places less importance on formal education and more on practical expertise.

Table 8
Depth of Knowledge Importance

Variable	P-Value
Demographics:	
Education	0.146
Gender	0.360
Race	0.152
Years of Experience	0.543
Design Sectors:	
Business and Industry	0.045*
Higher Education	0.333
K12 Education	0.763
Private Consultant	0.481
Government/Military	0.414
Other	0.965

Articulation Skills

Participants were then asked about the frequency with which SMEs demonstrate

Articulation Skills, along with the given definition of "…clearly describing what needs to be

taught" (Q3a; Appendix D). Respondents were given the following categories: never, rarely,

sometimes, often, and always. It was reported that subject matter experts demonstrate a moderate

level of articulation skills. Specifically, 0.8% answered never ($n = 1$), 14.1% answered rarely (n

$= 17$), 53.1% answered sometimes ($n = 67$), 31.3% answered often ($n = 40$), and 0.8% answered

always ($n = 1$). See Figure 10.
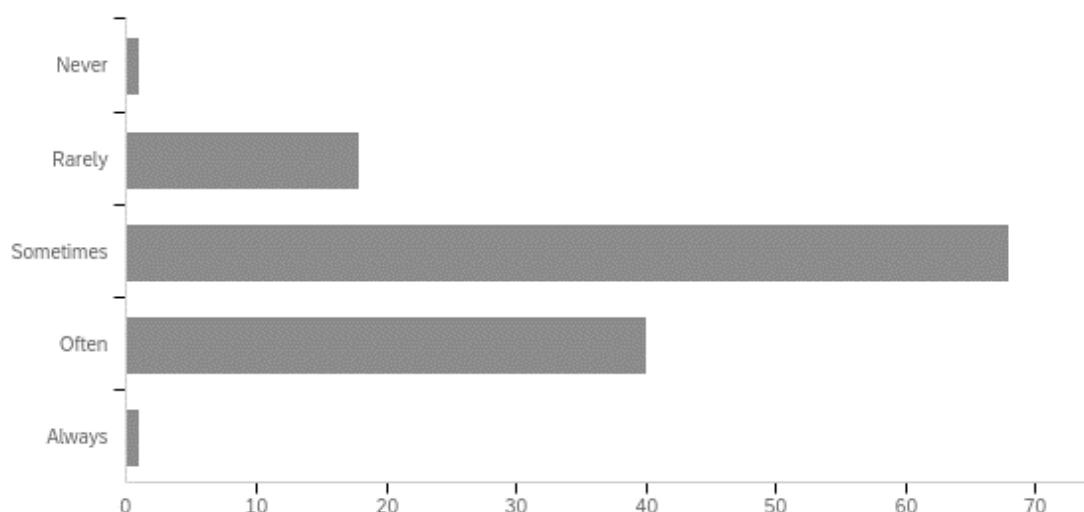
Figure 10 Articulation Skills Frequency.

It is noteworthy that there was a statistically significant difference in the demonstration of Articulation Skills (Q3a; Appendix D) among instructional designers in the Government/Military sector (p-value of 0.009) and the Higher Education sector (p-value of 0.023) compared to other sectors. Those ID in Higher Education experienced higher levels of articulation skills (3.313) than those outside of this sector (3.017). In contrast, IDs in government or military situations experienced lower articulation skills (2.800) than those outside the sector (3.245).

Table 9
Articulation Skills Frequency

Variable	P-Value
Demographics:	
Education	0.621
Gender	0.559
Race	0.402
Years of Experience	0.738

Design Sectors:

Business and Industry	0.423
Higher Education	0.023*
K12 Education	0.738
Private Consultant	0.377
Government/Military	0.009**
Other	0.240

Next, participants were asked to express their opinion on the importance of Articulation Skills in relation to SMEs, given the definition of "…clearly describing what needs to be taught" (Q3a; Appendix D). Respondents were given the following categories to choose from: not at all important, slightly important, moderately important, very important, and extremely important. Participants considered articulation skills to be highly important for subject matter experts, ranging from very important to extremely important. Only 1.6% found articulation skills not at all important ($n = 2$), 6.3% found them slightly important ($n = 7$), 14.1% found them moderately important ($n = 17$), 47.7% found them very important ($n = 61$), and 30.5% found them extremely important ($n = 39$), as shown in Figure 11.
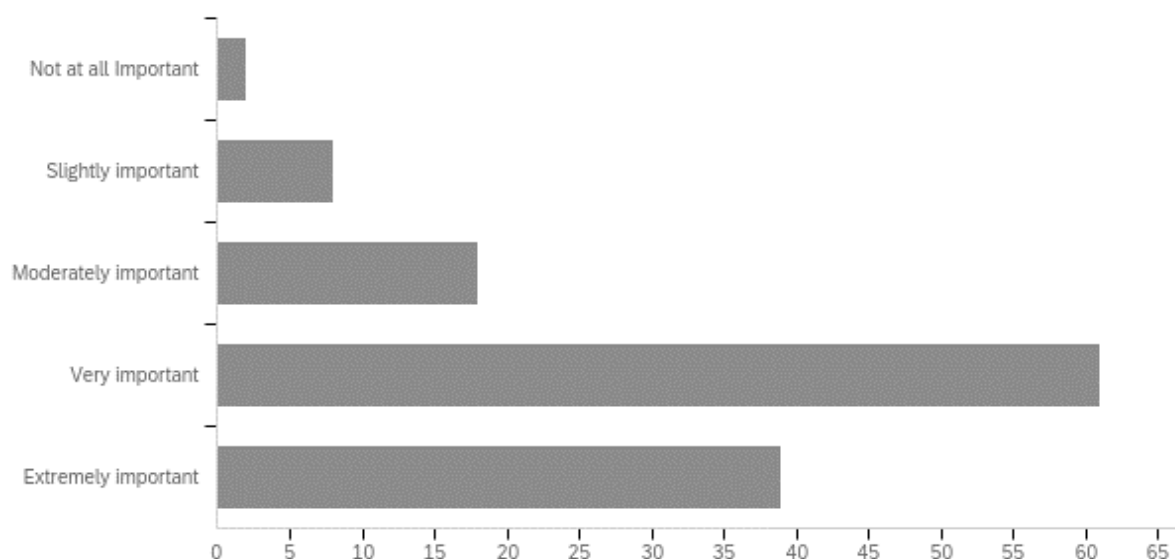
Figure 11 Articulation Skills Importance.

Several Kruskal-Wallis H and Mann-Whitney U tests were conducted to assess the association between the perceived importance of Articulation Skills (Q3b; Appendix D) and the demographic variables. Notable differences were observed involving the variables Gender and the Business and Industry sector. It was found that the Business and Industry sector displayed a statistically significant difference, with a p-value of 0.046. This indicates that instructional designers involved in the Business and Industry sector perceive the importance of Articulation Skills less (3.821) when compared to other sectors (4.186). Furthermore, the p-value of 0.019 suggests a significant difference in the importance attributed to Articulation Skills by IDs of different genders.

Table 10
Articulation Skills Importance

Variable	P-Value
Demographics:	

Education	0.729
Gender	0.019*
Race	0.936
Years of Experience	0.908

Design Sectors:

Business and Industry	0.046*
Higher Education	0.095
K12 Education	0.091
Private Consultant	0.494
Government/Military	0.140
Other	0.757

Suitability Factors

Suitability factors encompass Availability, Interpersonal Skills, and a Positive Attitude. Availability refers to the subject matter expert's ability to allocate time for fulfilling their responsibilities and their freedom to provide honest recommendations. Interpersonal Skills encompass attributes such as mannerisms, courtesy, and communication style. A Positive Attitude entails maintaining a positive outlook toward project goals and the development team.

Availability

Participants were asked to assess the frequency at which SMEs demonstrate Availability, using the provided definition of "…time to fulfill their obligations, attend meetings, and freedom to provide honest recommendations" (Q4a; Appendix D). Respondents were given the following categories: never, rarely, sometimes, often, and always. The majority of respondents indicated

they observed this factor, with only 1.6% answering it was never observed ($n = 2$), 10.3% answering it was rarely observed ($n = 13$), 52.4% answering it was sometimes observed ($n = 66$), 32.5% answering it was often observed ($n = 41$), and 3.2% answering it was always observed ($n = 4$), as shown in Figure 12.
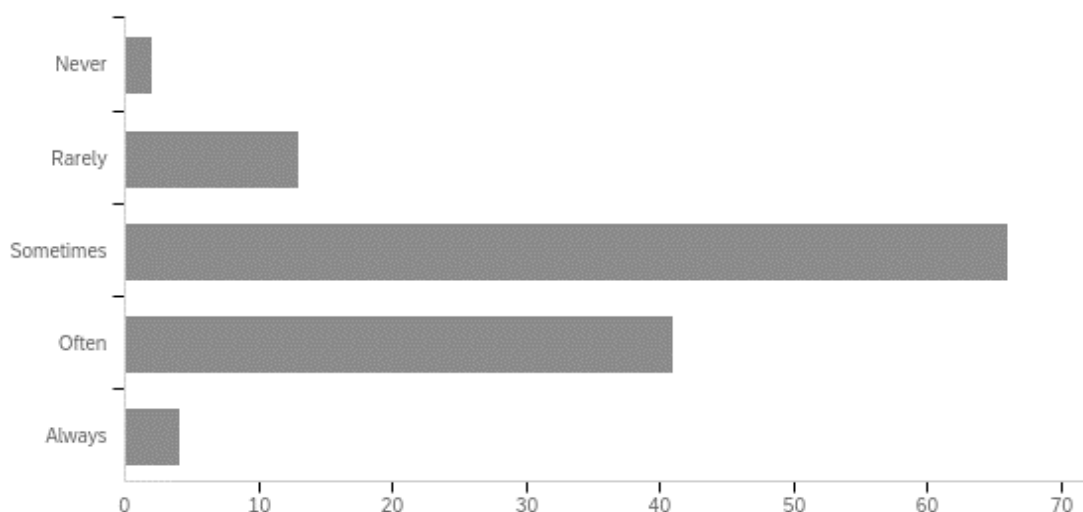
Figure 12 Availability Frequency.

The Mann-Whitney U test indicated a statistically significant difference in the opinions regarding the frequency of Availability (Q4a; Appendix D) demonstrated by subject matter experts, based on the respondents' identified race. The obtained p-value of 0.006 suggests that there was a notable variation in the perception of Availability frequency among instructional designers belonging to different racial backgrounds.

Table 11
Availability Frequency

Variable	P-Value
Demographics:	

Education	0.741
Gender	0.711
Race	0.006**
Years of Experience	0.583
Design Sectors:	
Business and Industry	0.823
Higher Education	0.878
K12 Education	0.874
Private Consultant	0.566
Government/Military	0.580
Other	0.240

Furthermore, participants were asked to express their opinion on the importance of Availability in relation to SMEs, using the provided definition of "…time to fulfill their obligations, attend meetings, and freedom to provide honest recommendations" (Q4b; Appendix D). Respondents were given the following categories: not at all important, slightly important, moderately important, very important, and extremely important. Among the respondents, only 0.8% considered it not at all important ($n = 1$), 1.6% found it slightly important ($n = 2$), 11.1% regarded it as moderately important ($n = 14$), 45.2% viewed it as very important ($n = 57$), and 41.3% recognized it as extremely important ($n = 52$), as depicted in Figure 13.
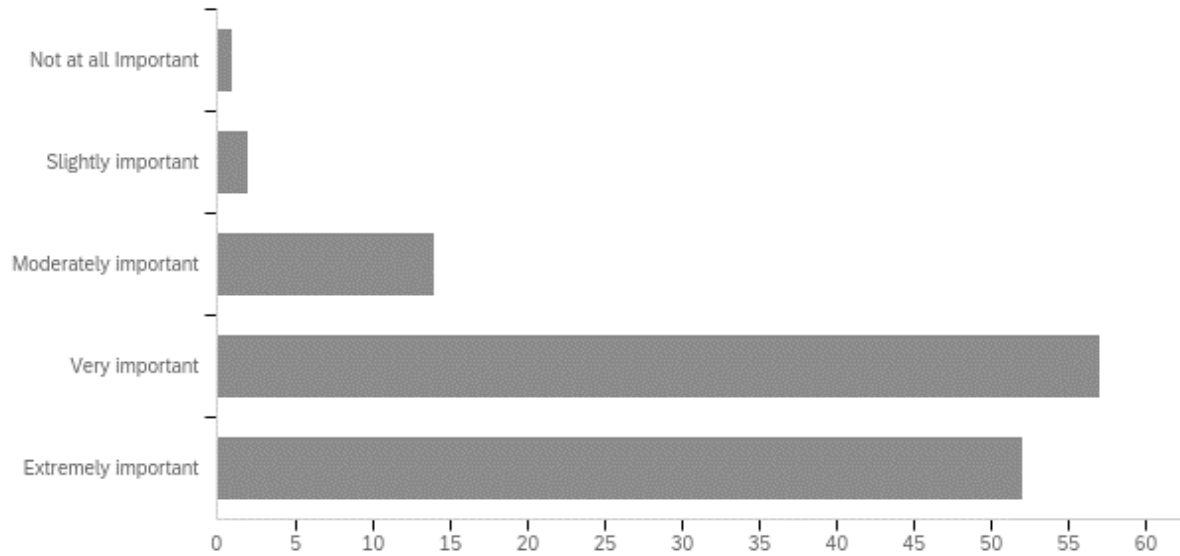
Figure 13 Availability Importance.

Both the Kruskal-Wallis H test and Mann-Whitney U test were performed to evaluate the
perceived importance of the Availability (Q4b; Appendix D) of subject matter experts,
considering various demographic variables. However, the results did not indicate any significant
differences in the perceived importance of Availability based on their education, gender, years of
experience, or specific sectors.

Table 12
Availability Importance

Variable	P-Value
Demographics:	
Education	0.966
Gender	0.702
Race	0.170
Years of Experience	0.262

Design Sectors:

Business and Industry	0.406
Higher Education	0.297
K12 Education	0.584
Private Consultant	0.757
Government/Military	0.742
Other	0.157

Interpersonal Skills

Participants were asked to assess the frequency at which SMEs demonstrate Interpersonal Skills, using the provided definition of "…professional courtesy, level of comfort, sense of humor, mannerisms, and communication style" (Q5a; Appendix D). Respondents were given the following categories: never, rarely, sometimes, often, and always. The majority of respondents felt that SMEs demonstrated this factor, with no responses of never ($n = 0$), 2.4% answering rarely ($n = 3$), 42.9% noticing this skill sometimes ($n = 54$), 48.4% seeing it often ($n = 61$), and 6.4% answering always ($n = 8$), as shown in Figure 14.
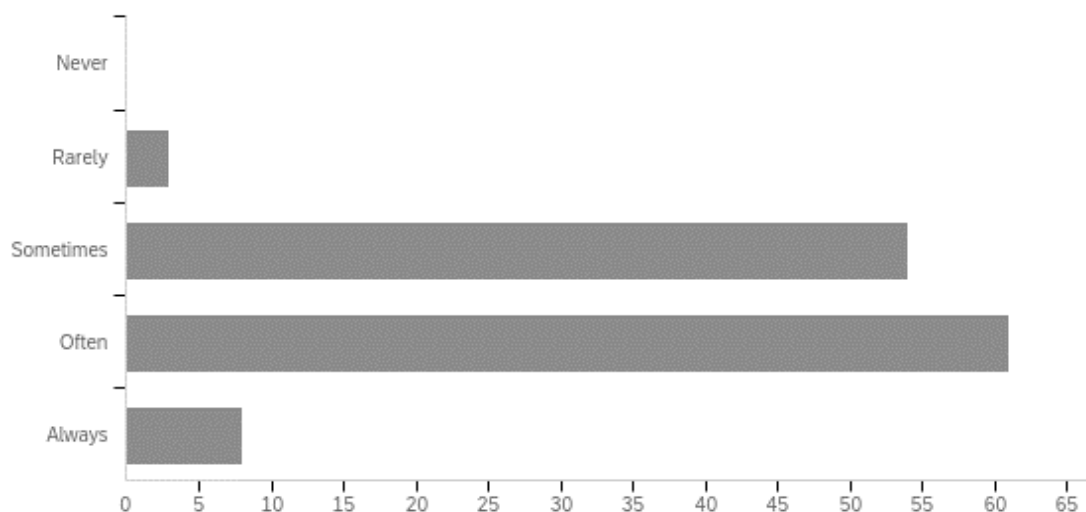
Figure 14 Interpersonal Skills Frequency.

Kruskal-Wallis H test and Mann-Whitney U tests were conducted to identify significant

differences between variables. Based on the available data from ID responses, a significant

difference of 0.006 was found in the Design Sector of "other." However, there was no significant

difference in the frequency of subject matter experts demonstrating Interpersonal Skills (Q5a;

Appendix D) based on their education, gender, race, or years of experience.

Table 13
Interpersonal Skills Frequency

Variable	P-Value
Demographics:	
Education	0.568
Gender	0.395
Race	0.842
Years of Experience	0.499
Design Sectors:	

Business and Industry	0.626
Higher Education	0.325
K12 Education	0.462
Private Consultant	0.318
Government/Military	0.311
Other	0.006**

Furthermore, participants were asked to express their opinion on the importance of Interpersonal Skills in relation to SMEs, using the provided definition of "…professional courtesy, level of comfort, sense of humor, mannerisms, and communication style" (Q5b; Appendix D). Respondents were given the following categories: not at all important, slightly important, moderately important, very important, and extremely important. Among the respondents, only 1.6% considered it not at all important ($n = 2$), 7.1% found it slightly important ($n = 9$), 30.2% regarded it as moderately important ($n = 38$), 45.2% viewed it as very important ($n = 57$), and 15.9% recognized it as extremely important ($n = 20$), as depicted in Figure 15. Although the Other group showed a significant difference, there were only 6 people within that group compared to 121 outside that group. Therefore, it is difficult to make accurate generalizations from these data.
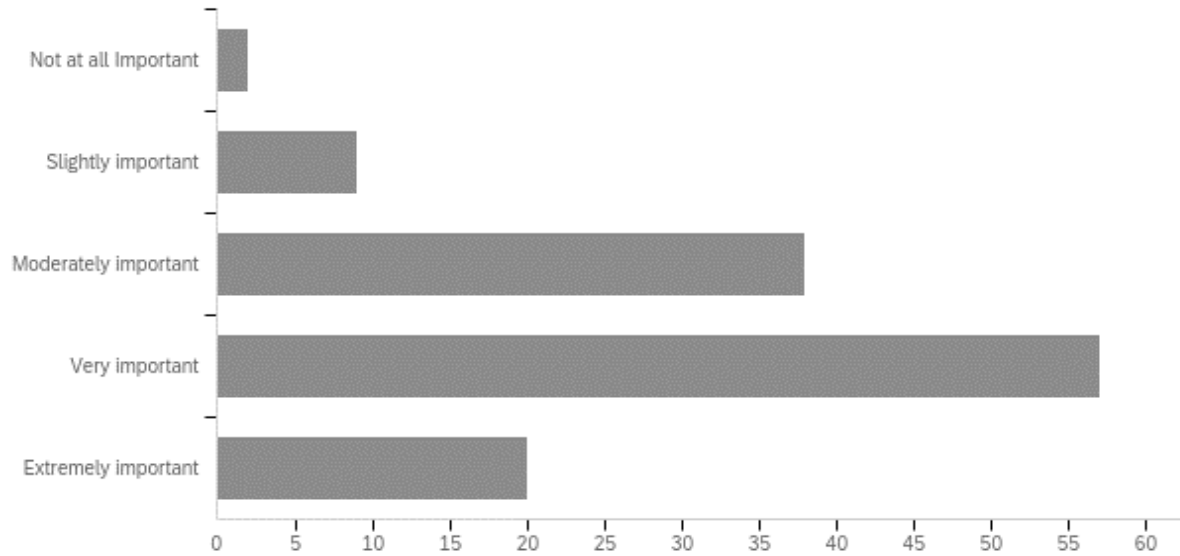
Figure 15 Interpersonal Skills Importance.

Kruskal-Wallis H test and Mann-Whitney U tests were conducted on the data variables. Based on the survey responses from ID participants, no significant difference was found in the importance attributed to Interpersonal Skills (Q5b; Appendix D) based on the demographic variables studied.

Table 14
Interpersonal Skills Importance

Variable	P-Value
Demographics:	
Education	0.847
Gender	0.175
Race	0.539
Years of Experience	0.804
Design Sectors:	

Business and Industry	0.149
Higher Education	0.143
K12 Education	0.469
Private Consultant	0.094
Government/Military	0.063
Other	0.792

Positive Attitude

Participants were asked about the frequency with which SMEs have demonstrated a Positive Attitude, along with the provided definition of "…positivity towards the project goals and development team" (Q6a; Appendix D). Respondents were given the following categories: never, rarely, sometimes, often, and always. None of the respondents reported that SMEs never possessed it ($n = 0$), 3.2% felt it was rarely present ($n = 4$), 42.1% witnessed it sometimes ($n = 53$), 49.2% saw it often ($n = 62$), and for 5.6% of respondents, it was always there ($n = 7$). Refer to Figure 16.
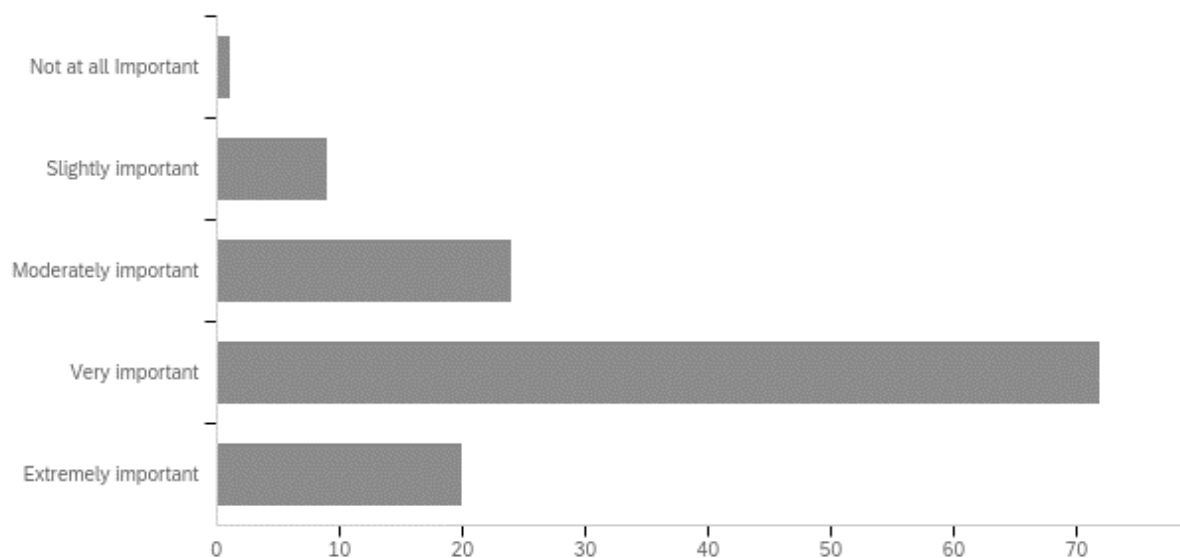
Figure 16 Positive Attitude Frequency.

Kruskal-Wallis H test and Mann-Whitney U tests were conducted to identify significant differences between survey variables. Based on the provided survey data, there was no significant evidence to suggest that any of the factors, including education, gender, race, years of experience, or sector of design, have a significant impact on the frequency of Positive Attitude (Q6a) displayed by subject matter experts towards project goals and the development team.

Table 15
Positive Attitude Frequency

Variable	P-Value
Demographics:	
Education	0.260
Gender	0.651
Race	0.604
Years of Experience	0.165
Design Sectors:	
Business and Industry	0.342
Higher Education	0.744
K12 Education	0.580
Private Consultant	0.468
Government/Military	0.347
Other	0.105

Subsequently, participants were asked to express their opinion regarding the importance of a Positive Attitude in relation to SMEs, using the provided definition of "…positivity towards

the project goals and development team" (Q6b; Appendix D). Respondents were given the following categories: not at all important, slightly important, moderately important, very important, and extremely important. The responses indicated that only 0.8% of participants considered a Positive Attitude was not at all important ($n = 1$), 7.1% found it slightly important ($n = 9$), 19.1% viewed it as moderately important ($n = 24$), 57.1% regarded it as very important ($n = 72$), and 15.9% considered it extremely important ($n = 20$), as shown in Figure 17.
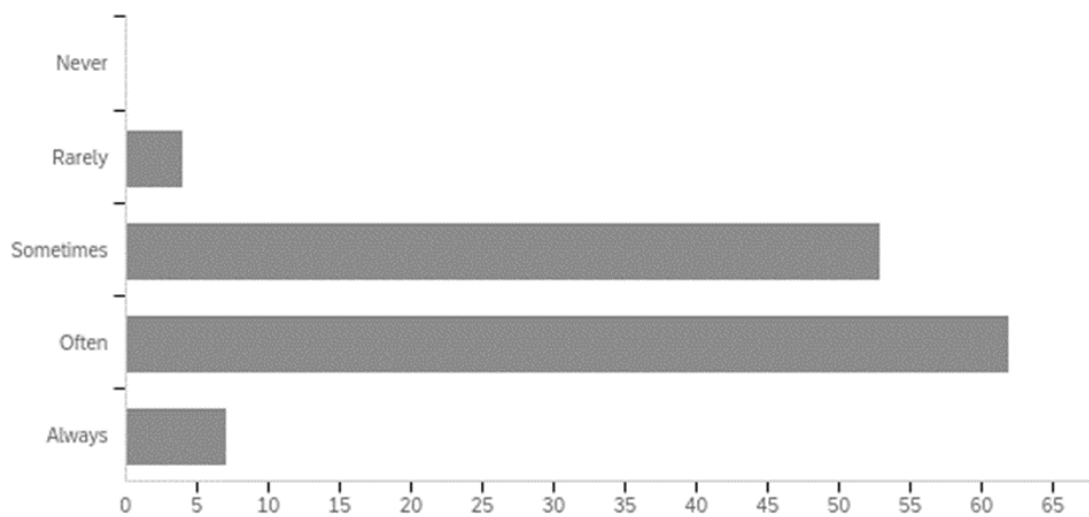
Figure 17 Positive Attitude Importance.

Based on the statistical tests conducted, including the Kruskal-Wallis H test and Mann-Whitney U test, the provided data indicates that there was no significant evidence to suggest that any of the factors (education, gender, race, years of experience, or sector of design) have a significant impact on the perceived importance of a positive attitude among subject matter experts.

Table 16

Positive Attitude Importance

Variable	P-Value
Demographics:	
Education	0.143
Gender	0.188
Race	0.167
Years of Experience	0.823
Design Sectors:	
Business and Industry	0.207
Higher Education	0.271
K12 Education	0.082
Private Consultant	0.173
Government/Military	0.393
Other	0.627

Additional Factors

Following the questions regarding the frequency and importance of the six SME factors, participants were then given the following open-ended questions: "Based on the previous questions, are there any other skills or factors that you believe influence the knowledge extraction experience? What are they and why do you feel they are important?" (Q7; Appendix D). A total of 65 responses were received and categorized into six distinct categories, as shown below.

1. Relationship and Communication

a. Openness to the ID profession

b. Awareness of the Instructional Designer's role

c. Valuing and acknowledging SMEs

d. Establishing roles and responsibilities

e. Building trust and professional relationships

f. Effective communication and collaboration

g. Interviewing skills

h. Respect for instructional designers and other stakeholders

2. Pedagogical and Learning

a. Understanding of best pedagogical practices

b. Knowledge of how people learn

c. Ability to explain fundamentals and simplify complex concepts

d. Awareness of measurable learning outcomes and alignment

3. Attitude and Mindset

a. Willingness to work with an ID

b. Willingness to learn and try new things

c. Humility and openness to different perspectives

d. Self-awareness and recognition of blind spots

e. Passion, enthusiasm, and confidence

f. Eagerness to explain and support learners

4. Technological Skills

a. Proficiency in corresponding technology and software

b. Familiarity with learning system capabilities

     c.   Technical skills for information sharing and navigation

5. Project Management and Collaboration

     a.   Ability to follow desired format and procedures

     b.   Knowledge of content development and expectations

     c.   Availability and commitment to project timelines

     d.   Support and encouragement from SME management

     e.   Problem-solving skills

6. Other Factors

     a.   Emotional intelligence and contextual understanding

     b.   Flexibility and willingness to accommodate different solutions

     c.   Knowledge of assessment and objectives

     d.   Previous research and initiative

     e.   Support for ID-SME collaboration from leadership

     f.   Respect for the instructional design process

     g.   Ability to synthesize and communicate material effectively

     h.   Solving problems and troubleshooting

Skills Considered Important Yet Lacking

Numeric values were assigned to each frequency response option: never = 1, rarely = 2, sometimes = 3, often = 4, and always = 5. Mean scores were calculated for each factor, indicating that SME factors were frequently observed, with mean scores ranging from 4.05 (Depth of Knowledge) to 3.17 (Articulation Skills). Numeric values were also assigned to the importance categories: not at all important = 1, slightly important = 2, moderately important = 3, very important = 4, and extremely important = 5. Instructional designers placed high importance

on these factors, with Depth of Knowledge ranking the highest (mean = 4.31) and Interpersonal

Skills ranking the lowest (mean = 3.67). Comparing the assigned importance to the observed

frequency, Availability was identified as the most lacking factor (score of 1), while Breadth of

Knowledge was perceived as the least lacking (score of 0.01). Refer to Table 5 for more details.

Table 17
Analysis of Means

SME Factor	Frequency	Importance	Lacking
Capability Factors:			
Breadth of Knowledge	3.87	3.88	**0.01**
Depth of Knowledge	**4.05**	**4.31**	0.26
Articulation Skills	**3.17**	3.99	0.82
Suitability Factors:			
Availability	3.25	4.25	**1.00**
Interpersonal Skills	3.59	**3.67**	0.08
Positive Attitude	3.57	3.80	0.23

Summary

This study examined 126 completed survey responses obtained from participants in three

Facebook groups and one LinkedIn group. Its objective was to gain a better understanding of the

demographics of the respondents and explore the frequency and importance of subject matter

expert (SME) capability and suitability factors from the perspective of instructional designers.

Analysis of the sample revealed that the majority of respondents were Caucasian (80%)

and female (79%). A significant proportion had completed a professional degree (65%) and

possessed 6-10 years of instructional design experience (31%). The survey included participants from various instructional design sectors, with Higher Education and Business/Industry sectors being the most represented, each accounting for 33% of the responses.

To examine the correlation between demographic factors (such as formal education, gender, race, years of ID experience, and design sector) and the capability and suitability factors, statistical tests were conducted. The Kruskal-Wallis H test was used to determine whether significant differences existed among the demographic designations and the capability and suitability factors.

The results indicated that formal education, years of ID experience, K-12 education sector, and private consultant sector did not display statistically significant differences in relation to the capability and suitability factors. However, other factors such as gender, race, business and industry sector, higher education sector, and government/military sector exhibited statistically significant differences when compared to the capability and suitability factors.

Overall, the findings of this study provide valuable insights for enhancing the knowledge extraction process and fostering collaboration between SMEs and instructional designers. These findings are discussed in more detail in the following chapter. The aim is to ultimately improve the delivery of information and enhance overall outcomes.

CHAPTER V: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This chapter includes a brief overview of the problem followed by key findings related to each research question. Also discussed are conclusions, implications for actions, and recommendations for further research.

Overview of the Problem

Online learning has gained increasing significance in education since the 1990s due to its numerous benefits, including reducing costs, recruiting students, increasing revenue, addressing overcrowding, and providing flexibility (Chen & Carliner, 2021). However, challenges arise in accessing answers and interpreting non-verbal cues in the online classroom (Valerio, 2021). To overcome these challenges, IDs and SMEs play distinct roles in course development, with IDs responsible for management, development, and design, while SMEs contribute expertise and knowledge (Rodriguez et al., 1991).

Valerio (2021) notes that one of the crucial objectives in designing a class or training is providing a path for the student to achieve the acquisition of knowledge. Achieving this objective necessitates collaboration between IDs and SMEs to provide a way to achieve the desired objectives. For this to happen, effective collaboration between the SME and ID must occur. Therefore, SMEs should possess expertise in the subject matter and the willingness and skills to collaborate effectively (Valerio, 2021).

A study by Mattoon (2005) identified six important SME factors. These include three capability factors: breadth of knowledge, depth of knowledge, and articulation skills, as well as three suitability factors: availability, interpersonal skills, and attitude. SMEs should possess a combination of capability factors and suitability factors to effectively contribute to the knowledge extraction process.

Breadth of knowledge refers to the formal education acquired by SMEs (Lavin et al., 2007). While formal education provides a basic understanding of the subject matter, SMEs should also have practical experience in the associated career field, known as depth of knowledge (Mattoon, 2005). Research by Hastie and Vlaisavljevic (n.d.) suggests that educators with higher work experience are more effective in promoting quality performance in learning activities.

Rouse et al. (2017) emphasize the importance of experts having both deep knowledge and the ability to influence and communicate their knowledge effectively. Even though SMEs may possess extensive knowledge, they may struggle with articulation skills allowing them to explain technical concepts to non-technical individuals (Mattoon, 2005). Effective communication is also crucial for understanding goals, exchanging ideas, and building strong relationships (Chen & Carliner, 2021). Establishing a common vocabulary, despite different educational backgrounds, minimizes tensions and ensures clear understanding (Xu & Morris, 2007; Pan & Thomas, 2009).

Apart from capability factors, suitability factors are also significant when working with SMEs. Availability, as described by Lavin et al. (2007), involves having sufficient time and freedom to fulfill obligations and contribute to the project. Independence is essential, enabling SMEs to provide unbiased recommendations based on their expertise (Lavin et al., 2007).

Interpersonal skills, such as professional courtesy, communication style, and sense of humor, are important for effective collaboration within project teams (Mattoon, 2005). Positive interpersonal relationships contribute to a sense of belonging and involvement in the project (Shockley-Zalabak, 2009).

The attitude of SMEs can also significantly impact their performance. Mattoon (2005) suggests that attitudes, which are deeply rooted beliefs, are not easily changed during the

curriculum development process. Positive attitudes, including open-mindedness, patience, and mutual respect, foster understanding, support, and collaboration (Outlaw & Rice, 2015; Bawa & Watson, 2017). A positive attitude leads to increased pride and personal interest in the final product, resulting in meticulous attention to organization and accuracy (Mattoon, 2005). Richardson et al. (2019) found that when the design team values a project highly, they invest more effort in developing a high-quality product.

SMEs' expertise, communication skills, availability, interpersonal relationships, and positive attitude all play vital roles in ensuring successful collaboration and the development of high-quality instructional materials. Heggart and Dickson-Deane (2022) note that project management and other administrative responsibilities belong to the ID. Emotional intelligence enables IDs to understand and manage emotions, promoting productive behavior and understanding others' perspectives (Shockley-Zalabak, 2009). Social exchange theory highlights the value of interpersonal relationships and resource exchange in achieving desired outcomes (Materne et al., 2012). Motivation and nonmonetary rewards, such as recognition and praise, have a longer-lasting impact on satisfaction than monetary rewards (Md Zani et al., 2011). Involving administrators and managers in the course development process provides additional support and resources (Bawa & Watson, 2017).

Challenges such as unclear role designation, ineffective communication, excessive workload, and concerns for academic autonomy can hinder the working relationship between IDs and SMEs (Pan & Thompson, 2009; Chen & Carliner, 2021). Identifying and addressing obstacles are necessary for maintaining interpersonal effectiveness and resolving conflicts (Shockley-Zalabak, 2009). Teamwork that emphasizes complementary skills, mutual

accountability, and shared decision-making can foster effective collaboration and synergy among team members (Andrade et al., 2021).

Purpose of Study

This study delved into the relationship between instructional designers and subject matter experts, with a specific emphasis on identifying the SME factors that are necessary but currently lacking in the knowledge extraction process. These factors, as described by Mattoon (2005), include three capability factors (breadth of knowledge, depth of knowledge, and articulation) and three suitability factors (availability, interpersonal skills, and attitude). The outcomes of this study have the potential to enhance the understanding of these factors and contribute to improvements in the quality and efficiency of educational projects.

Research Questions

This study aimed to address the current gaps in facilitating effective knowledge extraction by examining the capability and suitability factors. To achieve this objective, the following research questions were addressed in this dissertation project:

RQ1: How frequently have instructional designers encountered the capability and suitability factors in previous knowledge extraction?

RQ2: What capability and suitability factors do instructional designers consider important for effective knowledge extraction?

RQ3: Which capability and suitability factors do instructional designers consider to be lacking for effective knowledge extraction to occur?

Summary of Key Findings

Research Question 1

How frequently have instructional designers encountered the capability and suitability factors in previous knowledge extraction?

Questions were asked of IDs regarding the perceived frequency of each of the SME factors. Mean scores were determined using numeric response options as follows: never = 1, rarely = 2, sometimes = 3, often = 4, and always = 5. Scores were then calculated for each factor, with the higher scores indicating that SME factors were more frequently observed, and each factor's mean was determined. Refer to Table 18 for more details.

Table 18
Analysis of Means - Frequency

SME Factor	Frequency
Capability Factors:	
Breadth of Knowledge	3.87
Depth of Knowledge	**4.05**
Articulation Skills	**3.17**
Suitability Factors:	
Availability	3.25
Interpersonal Skills	3.59
Positive Attitude	3.57

Finding 1. Instructional designers reported seeing all the factors sometimes to often (mean =

3.58). The highest frequency reported was Depth of Knowledge (mean = 4.05) indicating they

often see this factor demonstrated. The lowest reported frequency was Articulation Skills (mean

= 3.17) representing that they sometimes work with SMEs who can communicate effectively.

The factors are categorized into Capability Factors and Suitability Factors.

Capability Factors:

- Breadth of Knowledge: The frequency rating for Breadth of Knowledge is 3.87.

    This suggests that SMEs commonly demonstrate a good level of formal education

    of acquired knowledge in their respective fields of expertise.

- Depth of Knowledge: The frequency rating for Depth of Knowledge is 4.05. This

    indicates that SMEs frequently demonstrate a strong level of experience and

    application of knowledge gained from working in their career fields. It suggests

    that they often possess a deep understanding and expertise in their areas of

    specialization.

- Articulation Skills: The frequency rating for Articulation Skills is 3.17. This

    suggests that SMEs may not consistently demonstrate strong skills in clearly and

    effectively describing what needs to be taught. There may be room for

    improvement in their ability to communicate information in a comprehensive

    manner.

Suitability Factors:

- Availability: The frequency rating for Availability is 3.25. This indicates that SMEs may not always be consistently available to fulfill their obligations, attend meetings, and provide honest recommendations. There may be instances where their availability is limited or compromised.

- Interpersonal Skills: The frequency rating for Interpersonal Skills is 3.59. This suggests that SMEs generally exhibit a moderate level of professional courtesy, comfort, sense of humor, mannerisms, and communication style. However, there may be some variability in their interpersonal skills, with room for improvement.

- Positive Attitude: The frequency rating for Positive Attitude is 3.57. This indicates that SMEs typically demonstrate a moderate level of positivity towards project goals and the development team. However, there may be instances where their attitude may not consistently align with project objectives or team dynamics.

Overall, the data suggests that SMEs generally demonstrate a good level of breadth of knowledge and depth of knowledge. However, there may be room for improvement in their articulation skills, availability, interpersonal skills, and maintaining a consistently positive attitude. These insights can be useful for organizations and individuals involved in instructional design to identify areas of focus for professional development and improvement in SME performance.

Finding 2. The frequency of each of the six factors was evaluated using the Kruskal-Wallis H test to evaluate differences among groups in nonparametric data and the Mann-Whitney U test to compare differences between two independent groups in nonparametric data. It was found that in terms of education, gender, and years of experience, there were no statistically significant differences observed in the demonstration of these attributes by SMEs ($p > 0.05$). However, a significant difference was indicated in the perceived frequency of the Availability of SMEs and race (p-value of 0.006). There were also some notable findings based on the sectors in which SMEs operate:

- Higher Education Sector: SMEs in the Higher Education sector demonstrated significantly higher levels of Breadth of Knowledge (p-value of 0.024) and Articulation (p-value of 0.023).

- Business/Industry Sector: SMEs in the Business/Industry section show a significant difference in Depth of Knowledge (p-value of 0.035).

- Other Sector: SMEs in the Other sector showed significantly higher levels of Interpersonal Skills (p-value of 0.006) compared to SMEs in other sectors ($p < 0.05$).

- Government/Military Sector: SMEs in the Government/Military sector showed significant scores (p-value of 0.009) in comparison to other factors.

It's important to note that statistical significance does not necessarily imply practical significance or generalizability to all contexts. These findings are based on the specific sample and should be interpreted with caution.

Research Question 2

What capability and suitability factors do instructional designers consider important for effective knowledge extraction?

Questions were asked of IDs regarding the perceived importance of each of the SME factors. Mean scores were determined using numeric response options as follows: not at all important = 1, slightly important = 2, moderately important = 3, very important = 4, and extremely important = 5. Scores were then calculated for each factor, with the higher scores indicating that SME factors were perceived as more important. Refer to Table 19 for more details.

Table 19
Analysis of Means – Importance

SME Factor	Importance
Capability Factors:	
Breadth of Knowledge	3.88
Depth of Knowledge	**4.31**
Articulation Skills	3.99
Suitability Factors:	
Availability	4.25
Interpersonal Skills	**3.67**
Positive Attitude	3.80

Finding 1. Instructional designers placed high importance on all the factors, with all the factors ranging from moderately important to very important (mean = 4.15). Depth of Knowledge

achieving the highest (mean = 4.31) indicating IDs feel Depth of Knowledge is very important. Interpersonal Skills ranked the lowest (mean = 3.67). The factors are categorized into Capability Factors and Suitability Factors.

Capability Factors:

- Breadth of Knowledge: The importance rating for Breadth of Knowledge is 3.88. This suggests that IDs consider formal education and the acquisition of knowledge in the SME's respective fields to be an important aspect.

- Depth of Knowledge: The importance rating for Depth of Knowledge is relatively high, at 4.31. This indicates that IDs place significant importance on SMEs' experience and the application of knowledge gained through working in their career field. It suggests that practical knowledge and expertise gained through hands-on experience are highly valued.

- Articulation Skills: The importance rating for Articulation Skills is 3.99. This suggests that IDs recognize the importance of SMEs being able to clearly and effectively communicate what needs to be taught. The ability to convey information in a comprehensible manner is considered a valuable skill for SMEs.

Suitability Factors:

- Availability: The importance rating for Availability is 4.25. This indicates that IDs consider SMEs' availability and commitment to fulfilling their obligations, attending meetings, and providing honest recommendations to be of high

importance. Timely availability and active participation are crucial for successful

collaboration in instructional design projects.

- Interpersonal Skills: The importance rating for Interpersonal Skills is 3.67. This

  suggests that IDs acknowledge the significance of SMEs' professional courtesy,

  comfort, sense of humor, mannerisms, and communication style in their

  interactions with others. Developing strong interpersonal skills is seen as

  important for effective collaboration and teamwork.

- Positive Attitude: The importance rating for Positive Attitude is 3.80. This

  indicates that IDs believe that SMEs maintaining a positive attitude towards

  project goals and the development team is important. A positive mindset is

  considered beneficial for motivation, teamwork, and achieving project objectives.

  skill for SMEs.

Overall, the data reflects the perceived importance of various factors by SMEs. It

indicates that IDs place high importance on the SME's depth of knowledge, availability, and

ability to articulate their expertise. Additionally, they recognize the significance of interpersonal

skills, positive attitude, and breadth of knowledge. These insights can be valuable for

organizations and individuals involved in instructional design to understand the key factors that

IDs prioritize and consider when evaluating their own performance.

Finding 2. The frequency of each of the six factors was evaluated using the Kruskal-Wallis H

test to evaluate differences among groups in nonparametric data and the Mann-Whitney U test to

compare differences between two independent groups in nonparametric data. The provided data

presents the statistical analysis of the perceived importance of different attributes for subject

matter experts (SMEs) in the field of instructional design. The data evaluates the importance of Breadth of Knowledge, Depth of Knowledge, Articulation Skills, Availability, Interpersonal Skills, and Positive Attitude, in relation to education, gender, race, years of experience, and the sectors they work in. There were no statistically significant differences observed in several categories namely education, race, and years of experience ($p > 0.05$). However, there were some notable findings based on Gender (p-value of 0.019) and the sectors in which SMEs operate as noted below.

- Business/Industry Sector: The Business/Industry sector showed significant statistical differences in three categories namely Breadth of Knowledge (p-value of 0.011), Depth of Knowledge (p-value of 0.045), and Articulation Skills (p-value of 0.046). This suggests that instructional designers involved in this sector assign a distinct level of importance to these three factors compared to other sectors and variables.

- Higher Education Sector: SMEs in the Higher Education sector demonstrated significantly higher levels of Breadth of Knowledge (p-value of 0.002).

It's important to note that statistical significance does not necessarily imply practical significance or generalizability to all contexts. These findings are based on the specific sample and should be interpreted with caution.

Research Question 3

Which capability and suitability factors do instructional designers consider to be lacking for effective knowledge extraction to occur?

After evaluating the frequency and importance of each of the SME factors, the means were calculated by comparing the assigned importance to the observed frequency. The factors with the largest and smallest score represented the most lacking to the least lacking, respectively.

Table 17
Analysis of Means

SME Factor	Frequency	Importance	Lacking
Capability Factors:			
Breadth of Knowledge	3.87	3.88	**0.01**
Depth of Knowledge	**4.05**	**4.31**	0.26
Articulation Skills	**3.17**	3.99	0.82
Suitability Factors:			
Availability	3.25	4.25	**1.00**
Interpersonal Skills	3.59	**3.67**	0.08
Positive Attitude	3.57	3.80	0.23

Finding 1. The data provided in this evaluation is based on the ID's perceived level of frequency and importance of various factors relating to their collaboration efforts with subject matter experts. As shown in Table 19, Availability was identified as the most lacking factor (score of 1), while Breadth of Knowledge was perceived as the least lacking (score of 0.01). The factors are categorized into Capability Factors and Suitability Factors.

Capability Factors:

- Breadth of Knowledge: The perceived lack of Breadth of Knowledge is minimal, with a value of 0.01. This suggests that SMEs generally possess the necessary formal education in their respective fields and are well-equipped with the foundational knowledge required for their expertise.

- Depth of Knowledge: The perceived lack of Depth of Knowledge is relatively higher, with a value of 0.26. This indicates that SMEs feel they could benefit from further experience and application of knowledge acquired through their work. It suggests that SMEs may need more exposure and opportunities to deepen their understanding and expertise in their respective areas.

- Articulation Skills: The perceived lack of Articulation Skills is notable, with a value of 0.82. This indicates that SMEs feel they may struggle to clearly communicate what needs to be taught. Improvement in communication and presentation skills may be necessary to effectively convey their knowledge and expertise to others. Alternatively, it may be possible that the potential gap between the ID and SME could be the source of articulation difficulties.

Suitability Factors:

- Availability: The perceived lack of Availability is relatively high, with a value of 1. This suggests that SMEs feel they have limitations in fulfilling their obligations, attending meetings, and providing honest recommendations due to time constraints or other factors. This may hinder their ability to actively participate and contribute to instructional design projects.

- Interpersonal Skills: The perceived lack in Interpersonal Skills is relatively low, with a value of 0.08. This indicates that SMEs generally demonstrate a satisfactory level of professional courtesy, comfort, sense of humor, mannerisms, and communication style. However, there is still room for improvement in fostering effective relationships and collaboration with others involved in the instructional design process.

- Positive Attitude: The perceived lack of Positive Attitude is relatively low, with a value of 0.23. This suggests that SMEs generally exhibit a positive outlook toward project goals and the development team. However, maintaining a positive attitude may still require attention and reinforcement to ensure continued motivation and engagement.

Overall, the data highlights specific areas where IDs perceive a lack of SMEs' capabilities and suitability for their roles. These insights can be useful for organizations and individuals involved in instructional design to identify areas for improvement and provide targeted support and training to address the identified gaps.

Finding 2. The open-ended responses provided additional insights into the skills and factors that influence the knowledge extraction experience. Participants highlighted several key areas.

- The relationship and communication between instructional designers and subject matter experts were emphasized. Openness to the ID profession, awareness of the ID's role, valuing and acknowledging SMEs, establishing clear roles and responsibilities, building trust and professional relationships, and effective communication and collaboration were all seen as important factors.

- The pedagogical and learning aspect was highlighted. SMEs should understand best pedagogical practices, knowledge of how people learn, the ability to explain fundamentals and simplify complex concepts, and awareness of measurable learning outcomes and alignment.

- The attitude and mindset of SMEs were considered significant. Willingness to work with an ID, openness to learning and trying new things, humility, self-awareness, passion, enthusiasm, and confidence were all seen as important traits for successful knowledge extraction.

- Other factors mentioned included technological skills for information sharing and navigation, project management and collaboration skills, emotional intelligence and contextual understanding, support for ID-SME collaboration from leadership, and respect for the instructional design process.

Overall, these responses highlighted the importance of building positive relationships, understanding pedagogical principles, fostering a collaborative mindset, and possessing the necessary technological and project management skills for effective knowledge extraction.

Conclusions

Based on the findings of this study, the researcher made the following conclusions:

Conclusions for Research Question 1:

The findings indicate that instructional designers have encountered all the capability and suitability factors in the previous knowledge extraction process to some extent. The highest frequency was reported for Depth of Knowledge, suggesting that instructional designers often

work with subject matter experts who possess a strong level of experience and expertise in their respective fields. On the other hand, the lowest reported frequency was for Articulation Skills, indicating that instructional designers sometimes work with SMEs who may struggle to effectively communicate information. This suggests a need for improvement in SMEs' ability to clearly articulate their knowledge.

Overall, the data shows that SMEs generally demonstrate a good level of Breadth and Depth of Knowledge. However, there is room for improvement in areas such as Articulation Skills, Availability, Interpersonal Skills, and maintaining a consistently Positive Attitude. These findings can be valuable for organizations and individuals involved in instructional design to identify areas of focus for professional development and improvement in SME performance.

Conclusions for Research Question 2:

The findings reveal that instructional designers consider all the capability and suitability factors to be important for effective knowledge extraction. Depth of Knowledge was perceived as the most important factor, indicating that instructional designers highly value SMEs' experience and practical knowledge. Interpersonal Skills received the lowest importance rating, suggesting that there is room for improvement when building effective relationships and collaborating with others.

These findings provide valuable insights into the factors that instructional designers consider important for effective knowledge extraction. Organizations and individuals involved in instructional design can use this information to prioritize these factors and enhance their collaboration with SMEs.

Conclusions for Research Question 3:

SMEs generally possess the necessary Breadth of Knowledge but feel a relatively higher lack of Depth of Knowledge. This suggests that SMEs could benefit from more experience and opportunities to deepen their understanding and expertise in their fields.

Articulation Skills were perceived to be lacking to a notable extent, indicating that IDs feel SMEs struggle to effectively communicate what needs to be taught. Improvement in communication and presentation skills is necessary to bridge this gap.

In terms of suitability factors, Availability was perceived to be lacking to a relatively high extent. IDs feel that SMEs have limitations in fulfilling their obligations and participating actively in instructional design projects due to time constraints or other factors. This highlights the importance of ensuring SMEs' availability for successful collaboration.

Interpersonal skills were perceived to have a relatively low lacking score, indicating that SMEs generally demonstrate satisfactory professional courtesy and communication. However, there is still room for improvement in fostering effective relationships and collaboration with others involved in the instructional design process.

Positive Attitude was also perceived to have a relatively low lacking score, suggesting that SMEs generally exhibit a positive outlook. However, reinforcing and maintaining a positive attitude can contribute to continued motivation and engagement.

These findings provide valuable insights into the areas where instructional designers perceive SMEs to be lacking in capabilities and suitability. Organizations and individuals

involved in instructional design can utilize these findings to provide targeted support and training to address the identified gaps and enhance the effectiveness of knowledge extraction.

Implications for Action

Based on the results from the survey analysis, conclusions, and literature review, the following implications are recommended:

Implications for Actions Based on the Conclusions for Research Question 1:

- Strengthening Articulation Skills: Organizations and individuals involved in instructional design should focus on providing training and support to help SMEs improve their ability to clearly communicate information. This could include workshops or coaching sessions focused on effective communication and presentation skills.

- Enhancing Availability: Efforts should be made to address the issue of limited availability among SMEs. Organizations can work with SMEs to better understand their constraints and find ways to optimize their participation in instructional design projects. This could involve scheduling flexibility, resource allocation, or workload management strategies.

- Developing Interpersonal Skills: Recognizing the importance of collaboration and effective relationships in instructional design, efforts should be made to enhance SMEs' interpersonal skills. Training programs or workshops that focus on teamwork, communication, and relationship-building can help SMEs foster productive interactions with instructional designers and other stakeholders.

- Promoting a Positive Attitude: Reinforcing and maintaining a positive attitude among SMEs can contribute to their motivation and engagement. Organizations can provide support and create a positive work environment that encourages SMEs to approach their role with enthusiasm and optimism.

Implications for Actions Based on the Conclusions for Research Question 2:

- Emphasizing Depth of Knowledge: Instructional designers should continue to value and leverage the experience and practical knowledge of SMEs. Efforts should be made to ensure that SMEs' expertise is effectively incorporated into the instructional design process.

- Strengthening Interpersonal Skills: Despite being considered less important, improving SMEs' interpersonal skills can enhance collaboration and teamwork. Organizations can provide training opportunities or facilitate networking events to help SMEs build effective relationships with instructional designers and other team members.

Implications for Actions Based on the Conclusions for Research Question 3:

- Providing Opportunities for Professional Development: To address the perceived lack of depth of knowledge, organizations can offer professional development opportunities, such as workshops, conferences, or mentorship programs, to help SMEs gain more experience and deepen their understanding in their respective fields.

- Enhancing Communication Skills: Recognizing the significant perceived lack of articulation skills, organizations should invest in training programs that focus on improving SMEs' communication and presentation abilities. This can involve providing resources, feedback, and practice opportunities to enhance their communication effectiveness.

- Addressing Availability Constraints: Organizations should work with SMEs to identify and address the factors that limit their availability. This may involve revising project timelines, allocating additional resources, or streamlining communication channels to ensure SMEs can fulfill their obligations effectively.

- Fostering Effective Collaboration: While interpersonal skills were perceived to have a relatively low lack, there is still room for improvement. Organizations can create a collaborative and supportive environment that encourages open communication, feedback exchange, and teamwork among SMEs and instructional designers.

- Sustaining a Positive Attitude: Organizations can implement strategies to reinforce and maintain a positive attitude among SMEs. This can include recognizing and rewarding their contributions, providing a supportive work environment, and fostering a culture of appreciation and motivation.

By taking these actions, organizations and individuals involved in instructional design can address the identified gaps and enhance the effectiveness of knowledge extraction from SMEs. This, in turn, can contribute to the development of high-quality instructional materials and improved learning outcomes.

Recommendations for Further Research

- Investigate Effective Strategies for Improving Articulation Skills: Given the identified lack of articulation skills among SMEs, further research can explore specific training programs or interventions that effectively enhance SMEs' ability to clearly communicate information. This research can focus on identifying and evaluating strategies such as communication workshops, presentation skills training, or mentoring programs aimed at improving SMEs' articulation abilities.

- Explore Factors Influencing Availability and Commitment of SMEs: The perceived lack of availability among SMEs highlights the need for further investigation into the factors that affect their ability to fulfill their obligations in instructional design projects. Future research can examine the underlying reasons for limited availability, including time constraints, competing responsibilities, or organizational barriers. Understanding these factors can inform the development of strategies to maximize SMEs' involvement and active participation in knowledge extraction processes.

- Assess the Impact of Interpersonal Skills on Collaboration: Although interpersonal skills were rated relatively lower in importance, it is still crucial to explore the impact of these skills on collaboration and teamwork within instructional design projects. Future research can examine the specific interpersonal skills that are most relevant to effective collaboration, such as active listening, conflict resolution, or building trust. Investigating the relationship between SMEs' interpersonal skills and the overall success of collaborative efforts can provide insights into areas for improvement and guide targeted interventions.

- Longitudinal Studies on the Development of SMEs' Expertise: To address the perceived lack of depth of knowledge among SMEs, longitudinal studies can be conducted to track the development of their expertise over time. This research can explore the factors that contribute to the deepening of SMEs' understanding and proficiency in their respective fields. By examining the impact of various experiences, opportunities for professional development, and continued learning on SMEs' knowledge growth, instructional designers can better support SMEs' ongoing development and address their evolving needs.

- Investigate Strategies for Sustaining Positive Attitudes: While SMEs generally exhibited a positive attitude, further research can explore strategies to foster and maintain this positivity throughout the instructional design process. This can involve examining the influence of organizational culture, motivation techniques, and support mechanisms on SMEs' attitudes and engagement. Understanding how to cultivate and sustain a positive attitude among SMEs can contribute to their long-term motivation, satisfaction, and effectiveness in knowledge extraction.

By conducting research in these areas, instructional designers and organizations can gain deeper insights into the specific factors affecting knowledge extraction from SMEs and develop targeted interventions and support systems to enhance the collaboration and performance of SMEs in instructional design projects.

Concluding Remarks

In conclusion, this study has shed light on the capabilities and suitability factors that instructional designers consider important in knowledge extraction from subject matter experts

(SMEs). The findings highlight the strengths and areas for improvement in SMEs' knowledge and skills, as well as the factors that influence effective collaboration between SMEs and instructional designers.

The research has shown that while SMEs generally demonstrate a good level of breadth and depth of knowledge, there is a need for improvement in articulation skills, availability, interpersonal skills, and maintaining a consistently positive attitude. These areas represent opportunities for targeted training and support to enhance SME performance and collaboration.

The recommendations for further research provide a roadmap for future investigations in the field of instructional design. Exploring effective strategies to improve SMEs' articulation skills, understanding the factors influencing their availability and commitment, assessing the impact of interpersonal skills on collaboration, conducting longitudinal studies on SMEs' expertise development, and investigating strategies for sustaining positive attitudes can contribute to the refinement of instructional design practices and the optimization of knowledge extraction processes.

By addressing these research gaps, instructional designers and organizations can develop evidence-based interventions and support systems that promote effective collaboration, enhance the quality of knowledge extracted from SMEs, and ultimately improve the overall outcomes of instructional design projects.

In summary, this study has provided valuable insights into the capabilities and suitability factors relevant to knowledge extraction from SMEs. It is hoped that the conclusions and recommendations presented here will stimulate further research, foster innovation in

instructional design practices, and contribute to the continuous improvement of knowledge

transfer and learning experiences.

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APPENDAGES

Appendix A Invitation Email for Organizations

Dear ORGANIZATION REPRESENTATIVE,

I am a doctoral student at Idaho State University's Graduate School of Psychology and Educational Leadership, specializing in Instructional Design and Technology. My dissertation aims to identify the capability and suitability factors lacking in subject matter experts, as perceived by instructional designers for effective knowledge extraction and collaboration. Given the study's specific focus on the instructional designer's perspective, I believe ORGANIZATION would be an excellent fit for this research. I have attached a sample email of the Encouragement to Participate Email I would like to have used.

I would greatly appreciate it if you could let me know if your organization is interested in participating. Please feel free to contact me at susanpalmer@isu.edu if you have any questions or if there is a specific person I should contact for further correspondence. Thank you for your consideration, and I look forward to collaborating with you.

Sincerely,

Susan Palmer
Idaho State University Doctoral Student
susanpalmer@isu.edu

Should you like to contact my Dissertation Chair his information is:

John H. Curry, PhD
Department Chair, Associate Professor
Phone: (208) 282-2585
johncurry@isu.edu

Appendix B Organization Encouragement to Participate Email

Hi, I am Susan Palmer, a doctoral candidate at Idaho State University pursuing a Doctor of Education in Educational Leadership with an emphasis on Instructional Design and Technology. My current research project is titled "Instructional Designers' Insights Regarding Factors that are Important Yet Lacking in Subject Matter Experts." The study aims to investigate the relationship between instructional designers (ID) and subject matter experts (SME) by identifying SME factors that are necessary but insufficient for efficient knowledge extraction and collaboration. The outcomes of this research project could lead to improvements in the selection and training practices of SMEs, and ultimately enhance the quality and effectiveness of educational projects.

If you are currently employed in the instructional design field and have experience with subject matter experts, I would like to invite you to participate in this study. This survey will take less than five minutes to complete, and the risks associated with this study are minimal if any. Your participation will remain confidential, and no personal information or organizational details will be shared. Your participation is strictly voluntary. If you decide to participate, you can refuse to answer any of the questions that may make you uncomfortable. You can quit at any time without your relations with the university, job, benefits, etc., being affected.

If you do choose to participate, you can access the Survey Questionnaire at https://bit.ly/3NxLGhE

Appendix C Encouragement to Participate Post

Hi, I'm a doctoral candidate at Idaho State University pursuing a Doctor of Education in Educational Leadership with an emphasis on Instructional Design and Technology. My current research project aims to investigate the relationship between instructional designers and subject matter experts (SME) by identifying SME factors that are necessary but insufficient for efficient knowledge extraction and collaboration. By participating in this study, you will have the opportunity to contribute information possibly leading to improvements in the selection and training practices of SMEs, and ultimately enhance the quality and effectiveness of educational projects.

If you are currently employed in the instructional design field and have experience working with a subject matter expert, I would like to invite you to participate in this study. This survey will take less than five minutes to complete, and the risks associated with this study are minimal if any. Your participation will remain confidential, and no personal information or organizational details will be shared. Your participation is strictly voluntary. If you decide to participate, you can refuse to answer any of the questions that may make you uncomfortable. You can quit at any time without your relations with the university, job, benefits, etc., being affected.

If you do choose to participate, you can access the Survey Questionnaire at https://bit.ly/3NxLGhE

Appendix D Survey

1a. In your experience, how often have subject matter experts demonstrated Breadth of Knowledge, which refers to the formal education acquired in the associated field of topic?

- a. Never
- b. Rarely
- c. Sometimes
- d. Often
- e. Always

1b. How important do you consider Breadth of Knowledge, which refers to the formal education acquired in the associated field of topic, for subject matter experts?

- a. Not at all important
- b. Slightly important
- c. Moderately important
- d. Very important
- e. Extremely important

2a. In your experience, how often have subject matter experts demonstrated Depth of Knowledge, which refers to experience and application of needed knowledge acquired from working in the associated career field?

- a. Never
- b. Rarely
- c. Sometimes
- d. Often
- e. Always

2b. How important do you consider Depth of Knowledge, which refers to experience and application of needed knowledge acquired from working in the associated career field, is for subject matter experts?

- a. Not at all important
- b. Slightly important
- c. Moderately important
- d. Very important
- e. Extremely important

3a. In your experience, how often have subject matter experts demonstrated Articulation Skills, which allow a subject matter expert to clearly describe what needs to be taught?

  a. Never
  b. Rarely
  c. Sometimes
  d. Often
  e. Always

3b. How important do you consider Articulation Skills, which allow a subject matter expert to clearly describe what needs to be taught, are for subject matter experts?

  a. Not at all important
  b. Slightly important
  c. Moderately important
  d. Very important
  e. Extremely important

4a. In your experience, how often have subject matter experts demonstrated Availability, which includes time to fulfill their obligations, attend meetings, and freedom to provide honest recommendations?

  a. Never
  b. Rarely
  c. Sometimes
  d. Often
  e. Always

4b. How important do you consider Availability, which includes time to fulfill their obligations, attend meetings, and freedom to provide honest recommendations, is for subject matter experts?

  a. Not at all important
  b. Slightly important
  c. Moderately important
  d. Very important
  e. Extremely important

5a. In your experience, how often have subject matter experts demonstrated Interpersonal Skills, which include professional courtesy, level of comfort, sense of humor, mannerisms, and communication style?

  a. Never
  b. Rarely

  c. Sometimes
  d. Often
  e. Always

5b. How important do you consider Interpersonal Skills, which include professional courtesy, level of comfort, sense of humor, mannerisms, and communication style, are for subject matter experts?

  a. Not at all important
  b. Slightly important
  c. Moderately important
  d. Very important
  e. Extremely important

6a. In your experience, how often have subject matter experts demonstrated a Positive Attitude, which includes positivity towards the project goals and development team?

  a. Never
  b. Rarely
  c. Sometimes
  d. Often
  e. Always

6b. How important do you consider a Positive Attitude, which includes positivity towards the project goals and development team, is for subject matter experts?

  a. Not at all important
  b. Slightly important
  c. Moderately important
  d. Very important
  e. Extremely important

7. Based on the previous questions, are there any other skills or factors that you believe influence the knowledge extraction experience? What are they and why do you feel they are important?

Demographic Questions

 8. What is the highest level of formal education you have completed?

  a. Less than high school
  b. High school or GED

       c. Some college
       d. 2-year degree
       e. 4-year degree
       f. Professional degree
       g. Doctorate

9. What is your gender?

       a. Male
       b. Female
       c. Non-binary/third gender
       d. Prefer not to say

10. Choose one or more races that you consider yourself to be.

       a. White or Caucasian
       b. Black or African American
       c. American Indian/Native American or Alaska Native
       d. Asian
       e. Native Hawaiian or Other Pacific Islander
       f. Other
       g. Prefer not to say

11. How many years of instructional design experience do you have?

       h. 1-5 years
       i. 6-10 years
       j. 11-15 years
       k. 16-20 years
       l. 21-25 years
       m. 26+ years

12. What sector(s) do you design for? Please select all options that apply.

       n. K-12 Education
       o. Higher Education
       p. Business and Industry
       q. Government/Military
       r. Private Consultant
       s. Other

Appendix E Informed Consent Survey Statement

This study is being conducted by Susan Palmer, a doctoral candidate at Idaho State University working on a Doctor of Education in Educational Leadership with an emphasis on Instructional Design and Technology. This study is a requirement to fulfill the researcher's degree and will not be used for decision-making by any organization. The title of this study is Instructional Designers' Insights Regarding Factors that are Important Yet Lacking in Subject Matter Experts. This study aims to identify subject matter experts' capability and/or suitability factors that are lacking yet deemed important by instructional designers for effective knowledge extraction. Research findings may provide information to understand and improve the process of knowledge extraction and SME/ID teamwork which, if found, could improve the delivery of information.

- You were asked to be in this study because you are a member of a participating organization, LinkedIn group, or Facebook group.
- This study will take less than five minutes to complete.
- No names will be collected in the survey.
- The risks associated with this study are minimal if any.
- The benefits of participation will allow you a voice in stating your desires, concerns, and opinions.
- You will receive no compensation – monetary or otherwise.
- The records of this study will be kept private. No words linking you to the study will be included in any sort of report that might be published.
- You have the right to get a summary of the results of this study if you would like to have them. You can get the summary by contacting the Principal Researcher, Susan Palmer at susanpalmer@isu.edu.
- You understand that your participation is strictly voluntary. If you do not participate, it will not harm your relationship with Idaho State University or your employer or group. If you decide to participate, you can refuse to answer any of the questions that may make you uncomfortable. You can quit anytime without being affected by relations with the university, job, benefits, etc.
- You can contact the researcher Susan Palmer at susanpalmer@isu.edu or the dissertation chair Dr. John Curry at johncurry@isu.edu with any questions about this study.

By completing and submitting this survey, you are giving consent for the principal investigator to include your responses in her data analysis.

Appendix F Coding Categories

a. Relationship and Communication
b. Pedagogical and Learning
c. Attitude and Mindset
d. Technological Skills
e. Project Management and Collaboration
f. Other Factors